This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

BOSTON
MEDICAL LIBRARY

IN THE
Francis A. Countway
Library of Medicine
BOSTON

THE TRANSACTIONS

OF THE

EDINBURGH OBSTETRICAL SOCIETY.

THE TRANSACTIONS

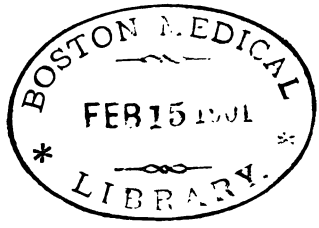
OF THE

EDINBURGH OBSTETRICAL SOCIETY.

VOL. XVII.

SESSION 1891-92.

EDINBURGH: OLIVER AND BOYD,
PUBLISHERS TO THE SOCIETY.
1892.



2225

PRINTED BY OLIVER AND BOYD, TWEEDDALE COURT, EDINBURGH.

PREFACE.

THIS, the seventeenth volume of the Society's Transactions, contains a record of its proceedings during the Session 1891–92.

In it, as in former volumes, the views brought forward in the papers are to be considered as those of the writers themselves, and not as those of the Society as a body.

October 1892.

EDINBURGH OBSTETRICAL SOCIETY.

OFFICE-BEARERS FOR SESSION 1891-92.

President.

PROFESSOR ALEXANDER RUSSELL SIMPSON, M.D., *F.*R.C.P. Ed.

Vice-Presidents.

JOHN PLAYFAIR, M.D., F.R.C.P. Ed.
A. H. FREELAND BARBOUR, M.D., F.R.C.P. Ed.

Treasurer.

WILLIAM CRAIG, M.D., F.R.C.S.Ed., 71 Bruntsfield Place.

Secretaries.

N. T. BREWIS, M.B., F.R.C.P. Ed., 23 Rutland Street.
JOHN W. BALLANTYNE, M.D., F.R.C.P. Ed., 24 Melville Street.

Librarian.

ROBERT MILNE MURRAY, M.B., F.R.C.P. Ed., 10 Hope Street.

Members of Council.

JAMES ANDREW, M.D., F.R.C.P. Ed.
WM. LOUDON REID, M.D., F.F.P.S. Glasg., Glasgow.
ALEXANDER MATTHEW, F.R.C.S. Ed., Corstorphine.
HENRY MACDONALD CHURCH, M.D., F.R.C.P. Ed.
FRANCIS WM. NICOL HAULTAIN, M.D., F.R.C.P. Ed.
JAMES FOULIS, M.D., F.R.C.P. Ed.
D. BERRY HART, M.D., F.R.C.P. Ed.
J. HALLIDAY CROOM, M.D., F.R.C.P. Ed.

LIST OF PRESIDENTS AND VICE-PRESIDENTS OF THE SOCIETY.

PRESIDENTS.

	Year.		Year.
Dr William Beilby,	1840–41	Dr Matthews Duncan,	1874–75
Sir James Y. Simpson, Bart.,	1842–57	Professor A. R. Simpson,	1876–77
Dr John Moir,	1858–59	Dr David Wilson,	1878–79
Dr Alex. Keiller,	1860–61	Dr Angus Macdonald,	1880–81
Dr T. H. Pattison,	1862–63	Professor A. R. Simpson,	1882–83
Dr T. Graham Weir,	1864–65	Dr John Connel,	1884–85
Sir James Y. Simpson, Bart.,	1866–67	Dr J. Halliday Croom,	1886–87
Dr John Burn,	1868–69	Dr C. E. Underhill,	1888–89
Dr Charles Bell.	1870–71	Dr D. Berry Hart,	1890–91
Dr L. R. Thomson,	1872–73	Professor A. R. Simpson,	1892

VICE-PRESIDENTS.

	Year.		Year.
Sir J. Y. Simpson, Bart.,	1840–41	Dr William Bryce,	1868–69
Dr Alex. Ziegler,	1840–41	Dr J. A. Sidey,	1868–69
Dr J. Cowan, R.N.,	1842	Dr William Menzies,	1870–71
Dr Fairbairn,	1842	Dr L. R. Thomson,	1870–71
Dr Charles Ransford,	1843	Professor A. R. Simpson,	1872–73
Dr R. B. Malcolm,	1843	Dr J. Matthews Duncan,	1872–73
Dr Charles Bell,	1844	Dr Angus Macdonald,	1874–75
John Kennedy, Esq.,	1844	Dr R. Peel Ritchie,	1874–75
Dr John Moir,	1845–47	Dr James Young,	1876–77
Dr T. H. Pattison,	1845–47	Dr Alex. Milne,	1876–77
Dr Beilby,	1848	Dr R. Peel Ritchie,	1878–79
Dr T. Graham Weir,	1848	Dr Angus Macdonald,	1878–79
Dr R. B. Malcolm,	1849–53	Professor A. R. Simpson,	1880–81
Dr John Moir,	1849–53	Dr Robert Bruce,	1880–81
Dr T. Graham Weir,	1854–55	Dr James Carmichael,	1882–83
Dr John Moir,	1854–55	Dr J. Halliday Croom,	1882–83
Dr W. Cumming,	1856–57	Dr Angus Macdonald,	1884
Dr A. Thomson,	1856–57	Dr Charles E. Underhill,	1884–85
Dr T. H. Pattison,	1858–59	Dr William Ziegler,	1885
Dr David Wilson,	1858–59	Professor A. R. Simpson,	1886–87
Dr T. Graham Weir,	1860–61	Dr Leith Napier,	1886
Dr George S. Keith,	1860–61	Dr D. Berry Hart,	1887–88
Dr T. Graham Weir,	1862–63	Dr James Foulis,	1888–89
Dr Alex. Keiller,	1862–63	Dr A. J. Sinclair,	1889
Dr T. H. Pattison,	1864–65	Professor A. R. Simpson,	1890
W. S. Carmichael, Esq.,	1864–65	Dr Peter A. Young,	1890–91
Dr John Burn,	1866–67	Dr John Playfair,	1891–92
Dr Charles Bell,	1866–67	Dr Freeland Barbour,	1892

LIST OF FELLOWS OF THE SOCIETY.

HONORARY FELLOWS.

1890 Apostoli, Dr, 5 Rue Molière, Paris.

1882 Barnes, Dr Robert, Lingwood, Liss, Hants.

1882 Battey, Dr R., 36 Broad Street, Rome, Georgia.

1886 Bozeman, Dr Nathan, 296 Fifth Avenue, New York.

1891 Budin, Prof., 129 Boulevard St Germain, Paris.

1886 Chiara, Professor Domenico, Florence.

1882 Clay, Dr Charles, Poulton-le-Fylde, Lancashire.

1882 Emmet, Dr, 93 Madison Avenue, New York.

1882 Freund, Professor, Kaiser Wilhelm's University, Strassburg.

1882 Goodell, Professor, 1418 Spruce St., Philadelphia.

1891 Gusserow, Prof., Charité, Berlin.

1891 Halbertsma, Prof., Utrecht.

1882 Hegar, Professor, Albert Ludwig's University, Freiburg.

1882 Hicks, Dr J. Braxton, 34 George St., Hanover Square, London, W.

1886 Keith, Dr Thomas, LL.D., 42 Charles St., Berkeley Square, London, W.

1892 Kidd, Dr George H., 58 Merrion Square, Dublin.

1892 Koeberlé, Dr Eugene, Strassburg.

1890 Lusk, Dr W. T., 47 E. Thirty-fourth Street, New York.

1892 Müller, Dr Peter, Professor der Geburtschülfe, an der Universitat, Berne, Switzerland.

1851 Oldham, Dr Henry, 4 Cavendish Place, London, W.

1889 Olshausen, Professor, Frauenklinik, Artillerie Strasse 13, Berlin.

1882 Pajot, Professor, Paris.

1882 Parvin, Professor, 1626 Spruce St., Philadelphia.

1892 Playfair, Professor Wm. S., LL.D., 31 George Street, Hanover Sq., London, W.

1882 Porro, Professor, Milan.

1882 Schultze, Professor B. S., University, Jena.

1892 Slavjansky, Professor R. J., Rue Liteinaia 24, St Petersburg.

1882 Spaeth, Professor, Vienna.

1882 Stadtfeldt, Professor, Copenhagen.

1864 Stolz, Professor, Nancy.

1890 Tait, Professor Lawson, LL.D., 7 The Crescent, Birmingham.

1882 Tarnier, Professor, Rue Duphot, Paris.

1882 Thomas, Professor T. G., 600 Madison Avenue, New York.

1882 Tibone, Professor, Turin.

1876 Turner, Professor Sir W., LL.D., 6 Eton Terrace, Edinburgh.

1887 Wells, Sir Spencer, M.D., 3 Upper Grosvenor Street, London, W.

1864 West, Dr Charles, Kenilworth, Eaton Road, West Brighton.

1891 Wilson, Dr H. P. C., 146 Park Avenue, Baltimore, U.S.A.

1882 Winckel, Professor, Ludwig-Maximilian's University, Munich.

CORRESPONDING FELLOWS.

1868 Aitchison, Dr James E. T., LL.D., Edinburgh.

1848 Allen, Mr Edward, York.

1857 Aveling, Dr James H., London.

1863 Belgrave, Dr, Sydney.

1898 Bentley, Dr Arthur J., London.

1880 Bosch, Dr Van Den, Liége.

1873 Boyd, Dr John, Slamannan.

1880 Brock, Dr W. J., Midlothian.

1863 Brown, Dr R. C., Preston.

1859 Cayzer, Mr Thomas, Liverpool.

1858 Coghill, Dr J. G. S., Ventnor.

1869 Davies, Mr Thos., Whittlesea.

1873 Donovan, Mr W., Birmingham.

1877 Engelmann, Dr G., Kreuznach.

1859 Figg, Mr E. G., Edinburgh.

1864 Finlay, Dr R. B., Q.C., Lond.

1868 Grenser, Dr Paul W. T., Dresden.

1864 Grévé, Dr, Norway.

1875 Groesbeck, Dr Hermann J., New York.

1853 Hall, Dr D., Montreal.

1848 Hartmann, Dr, St Petersburg.
1870 Haynes, Dr Stanley, Malvern.
1880 Helme, Dr J. M., Rusholme.
1865 Henderson, Dr E., China.
1849 Higgins, Dr Chas. H., Birkenhead.
1866 Hubbard, Prof., Connecticut.
1887 Hume, Dr T., Surgeon-Major, India.
1882 Husband, Dr H. Aubrey, Manitoba.

1871 Johnston, Dr A. C., R.N., Edinburgh.
1882 Johnston, Surgeon-Major Wilson, India.

1845 Keith, Dr George S., Currie.
1867 Kingston, Dr, Montreal.
1874 Kleinwächter, Prof. L., Grätz.
1865 Krassowski, Professor, St Petersburg.

1871 Lambert, Dr, Paris.
1849 Lawrence, Dr Samuel, Montrose.
1862 Leishman, Professor, Glasgow.
1883 Lindsay, Dr D., Pittinain.
1867 Lord, Dr Richard, Bournemouth.
1864 Lusk, Professor, New York.

1879 Machattie, Dr Thomas A., Australia.
1859 Macdonald, Dr F. R., Inveraray.
1878 Macdougall, Dr John A., France.
1862 Mackay, Dr M. A., Canada.
1870 M'Kendrick, Prof., Glasgow.
1869 M'Millan, Dr T. L., Australia.
1871 Madden, Dr T. More, Dublin.
1864 Main, Dr William, Birkenhead.
1866 Martin, Dr Karl, Berlin.
1860 Martine, Dr William, Haddington.
1882 Maslovsky, Dr, St Petersburg.
1860 Milburn, Dr George, Penzance.
1883 Mills, Dr B. Langley, India.
1861 Mitchell, Sir Arthur, LL.D., Edinburgh.
1877 Moolman, Dr Henry, South Africa.
1869 Mossop, Mr Isaac, Bradford.
1878 Mundé, Dr Paul F., New York.
1862 Murray, Dr David, London.
1859 Myrtle, Dr A. S., Harrogate.

1884 Neve, Dr E. F., Kashmir.
1849 Norris, Mr H., Petherton.

1857 Parker, Dr, Nova Scotia.
1869 Paton, Dr J. W., Rockferry.
1865 Phillippo, Dr J. C., Jamaica.
1853 Priestley, Dr W. O., LL.D., London.

1880 Reid, Dr James More, Aldershot.
1863 Ropes, Dr, Boston, U.S.A.

1878 Serdukoff, Dr A., St Petersburg.
1856 Skinner, Dr T., London.
1873 Slavjansky, Professor, St Petersburg.
1861 Stephenson, Prof. W., Aberdeen.
1888 Stevenson, Mr E. Sinclair, Cape of Good Hope.
1854 Storer, Dr H., Boston, U.S.A.
1875 Sutugin, Dr V., St Petersburg.

1867 Thomson, Mr W., Wrenbury.
1880 Turner, Dr William, Gibraltar.

1861 Veale, Dr H. R. L., London.

1872 Wallace, Professor John, Liverpool.
1840 White, Dr F. I., Perth.
1864 Whiteford, Dr James, Greenock.
1865 Wollowicz, Dr C., St Petersburg.

ORDINARY FELLOWS.

1879 Adam, Dr George Rothwell, Carlton House, Hotham Street, East Melbourne, Australia.
1869 Affleck, Dr J. O., 38 Heriot Row.
1886 Aikman, Dr Alfred, The Elms, Beverley Road, Hull.
1886 Aitchison, Dr R. S., 83 Gt. King Street.
1891 Alexander, Dr E. H., Albert St., Dunedin, New Zealand.
1889 Alexander, Dr G. F., A.M.D., Bengal.
1882 Alexander, Dr W. B., 8 Blenheim Place.
1888 Allison, Dr J., Fuller House, Kettering, Northampton.
1892 Anderson, Dr Fred. T., Standford, Liphook, Hampshire.
1868 Andrew, Dr James, 2 Atholl Cres.
1885 Anglin, Dr W. G., 52 Earl Street, Kingston, Ontario.
1877 Archibald, Dr J., Woodhouse-Eaves, Loughborough.
1886 Armitage, Dr J. A., 15 Waterloo Road South, Wolverhampton.
1889 Armour, Dr E. F., 149 Bruntsfield Place.
1883 Astley, Dr F. Dukenfield, Quyon, Ottawa, Canada.

1880 Badger, Dr W., Penicuik.
1887 Baildon, Dr F. J., 57 Hoghton Street, Southport.
1877 Balfour, Dr Andrew, 12 Abercorn Terrace, Portobello.
1847 Balfour, Dr G. W., 17 Walker St.
1884 Balfour, Dr J. Craig, West Street, Belford, Northumberland.
1855 Balfour, Dr T. A. G., 51 George Sq.
1870 Ballantyne, Dr A., Dalkeith.
1883 Ballantyne, Dr J. W., 24 Melville Street.

1879 Barbour, Dr A. H. Freeland, 8 Melville Crescent.
1884 Barrington, Dr Fourness, 7 Dorecote Road, Wandsworth Common, London, S.W.
1887 Baumgartner, Dr H. S., Saville Place, Newcastle-on-Tyne.
1888 Beattie, Dr Samuel, Pitlochry.
1884 Beatty, Dr W. J., Stockton-on-Tees.
1888 Bedford, Surgeon-Captain Charles H., M.D., D.Sc., M.R.C.S. Eng., H. M. Bengal Medical Service, care of W. Watson & Co., 27 Leadenhall St., London, E.C.
1892 Beilby, Dr Julius H., 10 Clarendon Crescent.
1884 Bell, Dr James L., Driffield, Yorkshire.
1878 Bell, Dr Robert, 29 Lynedoch St., Glasgow, W.
1877 Bentley, Dr G. H., Kirkliston.
1881 Black, Dr Alex., 13 Howe Street.
1863 Black, Dr J. Watt, 15 Clarges St., Piccadilly, London, W.
1888 Blaikie, Dr R. H., 42 Minto Street.
1887 Blair, Dr J. A., Straiton Manse, Maybole.
1876 Bleloch, Dr A., 2 Lonsdale Terrace.
1889 Boddie, Dr G. P., 147 Bruntsfield Place.
1891 Booth, Dr William, 2 Minto Street.
1888 Boxill, Dr N.L., 33 Buccleuch Place.
1887 Boyd, Dr J. St Clair, 19 Victoria Place, Belfast.
1883 Brewis, Dr N. T., 23 Rutland St.
1888 Brewis, Dr R. A., Waratah, Tasmania.
1881 Brodie, Dr W. Haig, 88 Oxford Terrace, Hyde Park, London, W.
1889 Brown, Surg.-Lt.-Colonel D. Blair-, A.M.D., Piershill Barracks.
1887 Bruce, Dr Alexander, 13 Alva St.
1877 Buist, Dr J. W., 1 Clifton Terrace.

1892 Cairns, Dr W. Murray, E. P. Mission, Taiwanfoo, Formosa, China.
1882 Calder, Dr H. L., 60 Leith Walk.
1888 Cameron, Professor James C., M.D., 941 Dorchester St., Montreal.
1885 Campbell, Dr Alex., 1 Clarendon Terrace, Dundee.
1887 Campbell, Dr W. M., 1 Prince's Gate East, Liverpool.
1862 Cappie, Dr Jas., 37 Lauriston Place.
1887 Carmichael, Dr Edward, 12 London Street.
1871 Carmichael, Dr James, 22 Northumberland Street.
1881 Chapman, Dr J. Milne, 7 Ardross Terrace, Inverness.
1887 Chepmell, Dr Charles, 87 Buckingham Road, Brighton.
1891 Chown, Dr A. P., 255 Brock St., Kingston, Canada.
1875 Church, Dr H. M., 36 George Sq.
1887 Clark, Dr J. A., 4 Cambridge Street.
1890 Cobbett, Dr C. N., 45 Rosslyn Hill, Hampstead, London, N.W.
1883 Collie, Dr Robert J., St George's Lodge, Catford, London, S.E.
1869 Connel, Dr J., Peebles.
1876 Cox, Dr Joshua J., St Ronan's, Eccles, Manchester.
1870 Craig, Dr Wm., 71 Bruntsfield Place.
1870 Croom, Dr J. Halliday, 25 Charlotte Square.
1885 Cruickshank, Dr B., Nairn.
1890 Cullen, Dr G. M., 48 Lauriston Pl.
1885 Cumming, Dr A. S., 18 Ainslie Pl.
1888 Cunningham, Dr John, Port Chalmers, New Zealand.
1882 Currie, Dr A. S., 81 Queen's Road, Finsbury Park, London, N.

1884 Darling, Dr T. Brown, 165 Bruntsfield Place.
1879 Davidson, Dr Alexander, 280 King Street W., Toronto, Canada.
1887 Davies, Dr E. T., 97 Shaw Street, Liverpool.
1892 Dendle, Dr Frank, Lochgelly, Fife.
1887 D'Evelyn, Dr F. W., The Mariposa, 824 Laguna St., San Francisco.
1882 Deverell, Dr H. C., 47 Maryfield Pl.
1891 Dewar, Dr M., 24 Lauriston Place.
1867 Dickson, Dr George, 9 India Street.
1888 Douglas, Dr A. Home, 6 W. Maitland Street.
1890 Douglas, Dr Carstairs, 3 Eglinton Place, Skelmorlie, Ayrshire.
1887 Drumheller, Dr F. E., 406 Market Street, Sunbury, Pennsylvania.
1887 Dubourg, Dr J. R. H., 120 Islington, Liverpool.
1879 Duncan, Dr A. J., Nethergate House, Nethergate, Dundee.
1890 Duncan, Dr A. S., Mains of Camno, Meigle, Perthshire.
1884 Dunlop, Dr H. M., 20 Abercromby Place.
1876 Dunsmure, Dr J., 53 Queen Street.

1888 Eden, Dr T. Watts, Hospital for Women, Fulham Road, London, S.W.
1879 Elder, Dr W. Nicol, 6 Torphichen St.
1890 Evans, Dr O. F., 79 Mulgarave Street, Liverpool.

1890 Farquharson, Dr J. D., 242 Westgate Road, Newcastle-on-Tyne.
1884 Felkin, Dr R. W., 20 Alva Street.
1885 Fenwick, Dr Kenneth N., 141 King Street West, Kingston, Canada.
1885 Ferguson, Dr J. Haig, 25 Rutland St.
1880 Finlay, Dr W. A., St Helen's, Russell Place, Trinity.
1890 Fitz-Gerald, Dr James, Kaitangata, Otago, New Zealand.

1892 Foggin, Dr George, 63 Westmorland Road, Newcastle-on-Tyne.
1887 Forbes, Dr A., Liberton.
1888 Fordyce, Dr William, 8 Melville Crescent.
1878 Foulis, Dr James, 34 Heriot Row.
1892 Fowler, Dr Simson C., Juniper Green.
1889 Fox, Dr James, Oak House, Croston, near Preston, Lancashire.
1887 Fox, Dr J. W., 53 Augusta Street, Poplar, London, E.
1883 Fraser, Dr F. W. Dyce, Gorton House, Lasswade.
1892 Fraser, Dr H. E., Tighneilein, Inverness.
1880 Fraser, Dr J. Joynor, Hessle, East Yorks.
1887 Fraser, Dr Nutting S., 228 Duckworth Street, St John's, Newfoundland.
1879 Freeland, Dr Richard, Broxburn.

1885 Gayton, Dr William, Bartram Lodge, Fleet Road, Hampstead, London, N.W.
1885 Gemmell, Dr J. E., 12 Rodney Street, Liverpool.
1888 Gibson, Dr W. A., 8 Sussex St., Warwick Square, London, S.W.
1890 Gibson, Dr W. Scott, Skipton, Yorks.
1892 Giffen, Dr J. J. M., Thornville, Jordanstown, Belfast.
1891 Giles, Dr A. B., 1 Kew Terrace.
1882 Gilmour, Dr T. F., Port Ellen, Islay.
1879 Glaister, Dr John, 4 Grafton Place, Grafton Square, Glasgow.
1885 Gracie, Dr C. B., Buccleuch Villa, Burntisland.
1888 Graham, Dr J. Gibson, 5 Ashgrove Terrace, Partickhill, Glasgow.
1877 Grasett, Dr F. L., 208 Simcoe Street, Toronto, Canada.
1891 Gray, Dr H. St Clair, 15 Newton Terrace, Glasgow.
1889 Greene, Dr J. W. N., 127 Zabala, Monte Video.
1890 Gulland, Dr G. L., 6 Randolph Place.
1888 Guthrie, Dr A. Cowan, 53 Charlotte Street, Leith.

1879 Hamilton, Dr J. R., Hawick.
1886 Hamp, Dr J. Walton, Penn Road, Wolverhampton.
1886 Hardcastle, Dr H. M., Archbold Lodge, Newcastle-on-Tyne.
1870 Hardie, Dr Thomas, 10 John's Place, Leith.
1891 Harkness, Dr A. C., 21 Ainslie Pl.
1877 Hart, Dr D. Berry, 29 Charlotte Square.
1889 Harvey, Dr Charles G., Kingswood, Sav-la-Mar, Jamaica, W.I.
1891 Harvey, Dr James, 1 Leopold Place.
1884 Haultain, Dr F. W. N., 17 Rutland Street.
1888 Havelock, Dr J. G., Sunnyside, Montrose.
1879 Hay, Dr Henry, 7 Brandon Street.
1888 Helm, Dr J. H., Ratho.
1892 Helm, Dr R. Dundas, 8 Brunswick Street, Carlisle.
1885 Helme, Dr T. A., St Mary's Hospital, Manchester.
1891 Henderson, Dr Alexander, 17 Fettes Row.
1857 Henderson, Dr John, 7 John's Place, Leith.
1881 Hewetson, Dr J., Holmfield, Reigate.
1882 Hillier, Dr A. P., Kimberley, Cape Colony.
1884 Hooper, Dr J. W. D., Lying-in Hospital, Melbourne, Australia.
1881 Hunter, Dr George, 33 Palmerston Place.
1881 Hurst, Dr George, Scott Chambers, 96 Pitt St., Sydney, N.S.W.
1857 Husband, Dr Wm., 4 Royal Circus.
1888 Hutcheson, Dr J., 8 Nelson Street.
1874 Hyslop, Dr J. M'A., 22 Palmerston Place.

1887 Inch, Dr Robert, Gorebridge.

1889 Jamieson, Dr Hugh, Hospital Inglas, Monte Video.
1889 Jamieson, Dr Hugh, care of Dr Luke, 39 East Main St., Titusville, Pa., U.S.A.
1866 Jamieson, Dr Jas., 43 George Square.
1871 Johnston, Dr W., Stirling.

1889 Keiller, Dr A. J., 54 Northumberland Street.
1890 Keiller, Prof. William, Medical College, Galveston, Texas, U.S.A.
1884 King, Dr J. K., The Glen Springs Sanitorium, Watkins, New York, U.S.
1887 Kirk, Dr Robert, Bathgate.
1892 Kynoch, Dr Campbell, 30 Springfield, Dundee.

1889 Lackie, Dr James, South Cliffe, Ventnor, Isle of Wight.
1891 Laing, Dr J. H. A., 11 Melville Street.
1891 Langwell, Dr H. G., 7 Trinity Cres.
1891 Lawson, Dr Thomas, 16 Dean Ter.
1892 Lee, Dr Herbert E., Leeholme, Woodville, New South Wales, Australia.
1886 Leigh, Dr J. Dickinson, The Close, Brotton, Yorkshire.
1886 Leslie, Dr G., Old Manse, Falkirk.

1891 Lester, Dr Charles E., Mudgee, N.S.W., Australia.
1887 Limont, Dr J., 3 Queen's Square, Saville Pl., Newcastle-on-Tyne.
1863 Linton, Dr John, 60 George Square.
1887 Linton, Dr Simon, Grangemouth.
1889 Little, Dr W. C., Warracknabeal, Victoria, Australia.
1890 Littlejohn, Dr Harvey, 13 Victoria Road, Sheffield.
1890 Lockhart, Dr F. A. L., 59 Metcalfe, Montreal, Canada.
1871 Lucas, Dr Robert, Dalkeith.
1888 Lundie, Dr William, 3 Glengyle Terrace.
1890 Lyle, Dr F. W., 50 Grange Road

1886 M'Call, Dr John, 4 Leopold Place.
1887 M'Callum, Dr H., Pitlochry.
1887 M'Creadie, Dr Wm., 164 Ferry Rd.
1887 Macdonald, Dr W. B., Dunbar.
1884 Macdonald, Dr W. Fraser, Auchtermuchty.
1890 M'Ewen, Dr Hugh, Carleton Place, Ontario, Canada.
1888 Macgregor, Dr G. S., 2 Burnbank Terrace, Glasgow.
1879 Mackay, Dr George, 2A Gilmore Place.
1884 Mackay, Dr G. Hugh, Elgin.
1887 Mackenzie, Dr R., 1 Bruntsfield Terrace.
1887 MacLachlan, Dr A., Beauly.
1890 M'Lean, Dr Archibald, Peebles.
1889 M'Murtry, Dr L. S., Louisville, Kentucky, U.S.A.
1873 M'Nab, Dr John, Obbe, Harris, Stornoway.
1887 Mackness, Dr G. O. C., Fort Street House, Broughty-Ferry.
1881 Macvie, Dr S., Chirnside.
1879 M'Watt, Dr John, The Square, Duns.
1885 Macwatt, Dr R. C., Indian Medical Service, 15th Bengal Cavalry, Peshawur, Bombay.
1887 Maddox, Dr Ralph H., Kirkheaton Rectory, near Huddersfield.
1889 Mann, Dr F. W., 3 Brandon Ter.
1891 Marshall, Dr G. Balfour, 4 E. Castle Road.
1879 Marshall, Dr Thomas, 55 Fortess Road, London, N.W.
1884 Marshall, Dr William, Milnathort.
1892 Martin, Dr Charles, 3 The Crescent, Birmingham.
1888 Martin, Dr Chris., 7 The Crescent, Birmingham.
1887 Martin, Dr J. W., 59 Ferry Road, Leith.
1887 Matheson, Dr A. A., 33 Buccleuch Place.
1888 Matheson, Dr F. W., 33 Buccleuch Place.
1885 Matthew, Dr Alex., Corstorphine.
1877 Menzies, Dr David, 20 Rutland Square.
1866 Messer, Dr Fordyce, Helensburgh.
1885 Michael, Dr Gustave, 188 Commercial Road, London, E.
1884 Millard, Dr W. W., 3 George Place.
1886 Miller, Dr W. H., 6 West Circus Place.
1885 Mills, Dr James, Janesville, Wisconsin, U.S.A.
1876 Moir, Dr Alex., 30 Buccleuch Place.
1840 Moir, Dr John, 52 Castle Street.
1880 More, Dr Jas., Rothwell, Kettering, Northampton.
1888 Morison, Dr Albert E., Brougham Terrace, Hartlepool.
1884 Mowat, Dr John, 1 Hope Park Ter.
1877 Murphy, Dr James, Holly House, Sunderland.
1889 Murray, Dr A. Lang, 18 Duddingston Park, Portobello.
1878 Murray, Dr D. R., 41 Albany Street, Leith.
1879 Murray, Dr Jas., 1 Brandon Street.
1880 Murray, Dr R. Milne, 10 Hope St.

1889 Nairne, Dr J. Stuart, 12 Royal Crescent, Crosshill, Glasgow.
1878 Napier, Dr A. D. L., 67 Grosvenor St., Grosvenor Sq., London, W.
1888 Narayan, Mr Kumar B., Cooch, Behar, India.
1885 Nesham, Dr T. Cargill, 12 Ellison Place, Newcastle-on-Tyne.
1891 Niekerk, Dr Alexander van, Georgetown, Cape Colony.
1886 Nisbet, Dr W. B., Townsville, N. Queensland, Australia.

1879 Oakes, Dr Arthur,

1885 Oliphant, Dr E. H. Lawrence, 18 Burnbank Terrace, Glasgow.
1887 Orr, Dr John, Innerleithen.
1889 Orr, Dr W. Basil, 14 Hope Street.

1883 Pairman, Dr T. Wyld, H. M. Prison, Lyttelton, New Zealand.
1888 Pareira, Dr Jervis, Delegado da Saude, do Districto de Lourenço Marguz, Em Mozambique, Africa Portuguesa.
1882 Paterson, Dr G. Keppie, 17 Forth St.
1890 Paterson, Dr William, 4 Thirlestane Road.
1840 Peddie, Dr Alex., 15 Rutland St.
1882 Peddie, Dr H. Anderson, 24 Palmerston Place.
1887 Perigal, Dr A., New Barnet, Herts.
1888 Pirie, Dr John, 9 Henderson Terrace.
1873 Playfair, Dr John, 5 Melville Cres.
1890 Poole, Dr T. D., Skippool, Poulton-le-Fylde.

1875 Porteous, Dr J. Lindsay, 83 Warburton Avenue, Yonkers, New York.
1890 Price, Dr A. W. Gordon, 22 Rankeillor Street.
1890 Price, Dr E. F. T., 28 Mayfield Rd.
1889 Price, Dr Joseph, 500, 20th Street, Philadelphia, U.S.A.
1887 Primrose, Dr Alex., 196 Simcoe Street, Toronto, Canada.
1886 Pringle, Dr J. Hogarth, 256 Bath Street, Glasgow.
1884 Proudfoot, Dr Thos., 13 Lauriston Place.
1885 Puckle, Dr S. Hale, Bishop's Castle, Shropshire.

1881 Ranking, Dr J. E., Tunbridge Wells.
1869 Rattray, Dr A. M. T., Portobello.
1880 Reid, Dr W. L., 7 Royal Crescent, Glasgow, W.
1880 Reid, Dr W. Spence, Oakley, Kirkcudbright.
1882 Rendell, Dr Herbert R., P.O. Box 606, St John's, Newfoundland.
1884 Richardson, Dr Wm., Bath Lodge, Reading.
1892 Ritchie, Dr A. Brown, 117 Boston Street, Hulme, Manchester.
1883 Ritchie, Dr D. W. L., 22 East Claremont Street.
1880 Ritchie, Dr James, 14 Charlotte Sq.
1861 Ritchie, Dr R. Peel, 1 Melville Crescent.
1887 Roberton, Dr Ernest, Auckland, New Zealand.
1890 Roberts, Dr Ernest T., 33 The Tything, Worcester.
1881 Robertson, Dr J., 30 Lauriston Pl.
1892 Robertson, Dr John A., 9 New Street, Basingstoke, Hants.
1870 Robertson, Dr W. B., St Anne's, Thurlow Park Road, West Dulwich, London, S.E.
1889 Robertson, Dr W. G. A., 26 Minto Street.
1890 Robinson, Dr H. Shapter, Talfourd House, Talfourd Road, Camberwell, London, S.E.
1887 Robson, Dr B. S., 66 Brighton Grove, Newcastle-on-Tyne.
1887 Ronalds, Dr Tennent, Hillowton, Castle-Douglas.
1877 Ronaldson, Dr T. R., 3 Bruntsfield Terrace.
1867 Rosa, Dr George, 12 Gayfield Sq.
1889 Ross, Dr James F. W., Sherborne Street, Toronto, Canada.
1879 Rowland, Dr L. Lindsay, Salem, Oregon, U.S.A.
1886 Rumboll, Dr Sydney, Hope Villa, Hillary Place, Leeds.
1890 Russell, Dr W., 46 Albany Street.

1891 Salmon, Dr C. Carty, Daisyhill, Amherst, Victoria, Australia.
1889 Sang, Dr J. E., Balcownie, Bedford Hill, Balham, London, S.W.
1885 Saunders, Dr F. A., Grahamstown, South Africa.
1880 Scott, Dr T. R., Musselburgh.
1892 Shaw, Dr W. J., Innerleithen.
1887 Shiels, Dr G. F., 229 Geary Street, San Francisco.
1858 Simpson, Prof. Alexander R., 52 Queen Street.
1882 Simpson, Dr James, Eastwood, Ferry Road.
1887 Sloan, Dr S., 5 Somerset Place, Sauchiehall St. West, Glasgow.
1882 Smart, Dr David, 74 Hartington Road, Sefton Park, Liverpool.
1870 Smith, Dr D., Fullerton Cottage, Johnshaven, Montrose.
1891 Smith, Dr Gains T., Moncton, New Brunswick, Canada.
1891 Smith, Dr James, 1 Parsonsgreen Terrace.
1885 Smith, Dr John, Brycehall, Kirkcaldy.
1892 Smith, Dr J. Gordon, West Auckland, Co. Durham.
1890 Smith, Dr William, 14 Hartington Gardens.
1888 Sneddon, Dr William, Cupar-Fife.
1881 Somerville, Dr Robert, Galashiels.
1867 Spalding, Dr William, Gorebridge.
1878 Spence, Dr R., Burntisland.
1884 Spence, Dr William, Dollar.
1884 Stewart, Dr J. S., 5 Merchiston Pl.
1885 Stewart, Dr R., 42 George Square.
1879 Stewart, Dr W., Kirkwall.
1892 Stirling, Dr R., 4 Athole Pl., Perth.
1866 Stirling, Dr Stewart, 6 Clifton Ter.
1887 Sturrock, Dr J. F., Homewood, Broughty-Ferry.
1887 Sutherland, Dr G. A., 45 Carlton Hill, St John's Wood, London, N.W.
1885 Sym, Dr A. C., 144 Morningside Rd.

1868 Taylor, Dr Wm., 12 Melville Street.
1887 Teacher, Dr C., 16 Newington Road.
1888 Temple, Dr G. H., Salford Union Infirmary, Eccles, Manchester.
1888 Tennent, Dr J. T., Bathgate.
1877 Thatcher, Dr C. H., 13 Albany St.
1891 Thin, Dr Robert, 6 Albany Street.
1884 Thom, Dr Alexander, Viewfield, Crieff.
1877 Thomson, Dr A. D. R., Musselburgh.
1887 Thomson, Dr Alexis, 2 Coates Crescent.
1881 Thomson, Dr James, David Place, St Heliers, Jersey.
1887 Thomson, Dr John, 14 Coates Crescent.

1877 Thomson, Dr J. Stitt, Dalkeith.
1887 Thyne, Dr T. J., 2 Dean Terrace.
1887 Tristan, Dr R. J., Retford, Notts.
1889 Turnbull, Dr James L., Newton P.O., Ontario, Canada.
1869 Turnbull, Dr M., Coldstream.

1872 Underhill, Dr C. E., 8 Coates Crescent.
1885 Underhill, Dr Fred. T., 37 Owen Street, Tipton, Staffordshire.
1879 Underhill, Dr T. Edgar, Bromsgrove, Worcestershire.

1891 Vassie, Dr Alex. H., Lisaghmore, Kirkcaldy.
1892 Vickery, Dr W. H., 52 Elswick Road, Newcastle-on-Tyne.

1886 Walker, Dr A. Wallace, 24 Forth Street.
1879 Wallace, Dr Abraham, 64 Harley Street, London, W.
1887 Watson, Dr P. H., 72 Jesmond Road, Newcastle-on-Tyne.
1865 Watson, Dr W., 34 Fountainhall Road.
1881 Waugh, Dr John, 36 Finsbury Pavement, London, E.C.
1881 Webster, Dr A. D., 20 Newington Road.
1889 Webster, Dr J. C., 56 Queen Street.
1882 Weight, Dr R. Hill, 2 Copthall Buildings, London, E.C.
1889 Welby, Dr Frederick E., Colonial Surgeon, St Helena.
1886 Whitton, Dr A. B., Aberchirder.
1887 Wicks, Dr Charles, 52 Elswick Road, Newcastle-on-Tyne.
1889 Wilkinson, Dr George, 3 Dingle Hill, Liverpool.
1867 Will, Dr Ogilvie, 379 Union Street, Aberdeen.
1889 Williams, Dr J. D., Gwerullwyn House, Dowlais, South Wales.
1845 Wilson, Dr David, 12 Dean Terrace.
1889 Wilson, Dr James, 53 Inverleith Row.
1879 Wilson, Dr T. D., 10 Newington Road.
1890 Wise, Dr Robert, Highgate View, Kendal.
1889 Wood, Dr A. Fleming, City Fever Hospital.
1880 Wood, Dr Russell, 9 Darnaway Street.
1886 Wood, Dr Thomas, 55 Ferry Road.
1892 Wood, Dr William, 19 Roxburgh Street.
1887 Wright, Dr W. F., 105 Ferry Road, Leith.
1879 Wylie, Dr Hamilton, 1 George Place.

1891 Yoe, Dr Richard T., Louisville, Kentucky, U.S.A.
1861 Young, Dr James, 14 Ainslie Place.
1891 Young, Dr J. Y. Simpson, 14 Ainslie Place.
1859 Young, Dr Peter, 43 Heriot Row.
1871 Young, Dr Peter A., 25 Manor Place.

CONTENTS.

I.—COMMUNICATIONS RELATING TO OBSTETRICS.

PAGE

Studies in Fœtal Pathology and Teratology. By Dr J. W. Ballantyne, viz.—

I. The Investigation of Fœtal Disease, . . . 53

II. Clinical Notes of Four Cases, and Description of Two Specimens of General Dropsy of the Fœtus, . . 133

III. General Dropsy of the Fœtus, ... 148

IV. General Dropsy of the Twin Fœtus, . . . 177

V. The Sectional Anatomy of an Anencephalic Fœtus, . 228

VI. On a Case-taking Scheme for Fœtal Diseases and Deformities, ... 262

The Influence of Influenza upon Women. By Dr Robert W. Felkin, 68

On Asthma Gravidarum, with an Illustrative Case. By Dr J. Halliday Croom, ... 74

On the Alleged Growth of the Placenta in Extra-uterine Gestation after the Death of the Fœtus. By Dr D. Berry Hart, . . 79

Cases Illustrative of Operative Interference with Fibroid Tumours during Pregnancy, Labour, and Puerperium. By Dr J. Halliday Croom, ... 92

A Series of Thirteen Cases of Alleged Maternal Impression. By Dr J. W. Ballantyne, ... 99

Notes on a Case of Placenta Prævia. By Dr G. Owen C. Mackness, . 116

On the Structure of the Human Placenta, with special reference to the Origin of the Decidua Reflexa. By Dr D. Berry Hart, . 195

On Thrombosis of the Pulmonary Arteries, with reference to Treatment by Inhalation of Oxygen. By Dr Henry M. Church, . 210

A Note on the Use of the Axis-traction Forceps in the High and Low Operation. By Dr Michael Dewar, ... 221

The Female Pelvis in the beginning of the Fifth Month of Pregnancy. By Dr J. C. Webster, ... 244

Notes of a Case bearing on a Relation between Menstruation and Impregnation. By Dr R. Milne Murray, . . . 281

II.—COMMUNICATIONS RELATING TO GYNÆCOLOGY.

Valedictory Address. By Dr D. Berry Hart, ... 2

Note on a Case of Vaginal Hysterectomy for Carcinoma Cervicis in Early Pregnancy. By Dr D. Berry Hart, . . . 12

PAGE

The Influence of Influenza upon Women. By Dr Robert W. Felkin, 68

Cases Illustrative of Operative Interference with Fibroid Tumours during Pregnancy, Labour, and Puerperium. By Dr J. Halliday Croom, ... 92

On Two Cases of Vaginal Hysterectomy for Sarcoma of the Uterus. By Dr N. T. Brewis, ... 120

Pedunculated Uterine Growths: A Practical *Résumé* of a Series of Cases. By Dr F. W. N. Haultain, ... 255

A Series of Abdominal Sections. By Dr N. T. Brewis, . . . 270

III.—COMMUNICATIONS RELATING TO PEDIATRICS.

On Congenital Obliteration of the Bile-ducts. By Dr John Thomson, 17

Studies in Fœtal Pathology and Teratology.—I. The Investigation of Fœtal Disease. By Dr J. W. Ballantyne, ... 53

A Series of Thirteen Cases of Alleged Maternal Impression. By Dr J. W. Ballantyne, ... 99

Case of Congenital Obliteration of the Small Intestine. By Dr John Thomson, ... 128

Studies in Fœtal Pathology and Teratology.—II. Clinical Notes of Four Cases, and Description of Two Specimens of General Dropsy of the Fœtus. By Dr J. W. Ballantyne, ... 133

Case of Partial Obliteration of the Gall-Bladder in a New-born Infant, associated with numerous other Congenital Malformations. By Dr John Thomson, ... 191

Studies in Fœtal Pathology and Teratology.—VI. On a Case-taking Scheme for Fœtal Diseases and Deformities. By Dr J. W. Ballantyne, ... 262

IV.—MATERNITY HOSPITAL REPORTS.

Report of the Royal Maternity and Simpson Memorial Hospital for the Quarter ending 30th April 1891. By Dr G. Balfour Marshall and Dr E. H. Alexander, ... 108

Report of the Royal Maternity and Simpson Memorial Hospital for the Quarter ending 31st July 1891. By Dr Hamilton G. Langwill, 287

TRANSACTIONS

OF THE

EDINBURGH OBSTETRICAL SOCIETY,

FOR SESSION LIII., 1891-92.

MEETING I.—NOVEMBER 11, 1891.

Dr BERRY HART, *retiring President, afterwards* Professor SIMPSON, *President-elect, in the Chair.*

I. *Dr John Thomson* exhibited the LIVER from the case of congenital obliteration of the bile-ducts described in his paper on that subject, along with a number of drawings illustrating its minute anatomy.

II. *Dr J. A. Clarke* showed, for Dr Brewis, two SARCOMATOUS UTERI which he had removed during the last fortnight by vaginal hysterectomy. Both were examples of sarcoma. The interior of one uterus was occupied by a mass the size of the fist of soft colloid consistence, attached to the body by a distinct pedicle. This tumour was pronounced by Dr Bruce to be a myxo-sarcoma. The other uterus presented a good example of the diffuse form of sarcoma. The whole of its endometrium was thickened, to the extent of ¼ inch, by a soft, brain-like substance, which on microscopical examination was found to contain round-celled sarcomatous and also epithelial cells. The ovaries and tubes in the latter case were also removed.

III. *Dr J. C. Webster* exhibited the HEAD OF A FŒTUS which had been delivered by forceps. The case was one of great interest, as showing one of the results of the antero-posterior grip of the head by the forceps during delivery in a flat pelvis. The mother when first seen had been in labour for two days, the waters having

escaped twelve hours previously. The child was lying with the head presenting, but above the brim, the long diameter being transverse, the occiput looking to the left side; movements of its limbs were felt from time to time, and its heart was easily heard. The woman was healthy and well formed, with the exception that there was an antero-posterior contraction of the pelvic inlet, the conjugate measuring between 3¼ and 3½ inches. It was deemed a most suitable case for the employment of the method of delivery so strongly recommended by Dr Milne Murray. The axis-traction forceps were applied without much trouble, save in the passage of the right blade over the face of the fœtus. The first effect of traction was to cause a bulging down of the vertex, the occipital and frontal bones telescoping under the parietals. Then the whole head began to descend. When low down in the pelvis the head began to rotate until at the outlet the occiput came to the front. On complete delivery of the child, which was a large female, it was not breathing, though its heart was beating faintly. Artificial respiration was kept up for some time, but to no purpose. The post-mortem examination of the child revealed the presence of a rupture of the longitudinal sinus half an inch behind the coronal suture. The vertex of the brain under the dura mater was covered with blood, and a large amount was found at the base of the brain around the medulla, having evidently found its way there from the vertex through the subarachnoid space. The injury seems to have resulted from the excessive telescoping of the cranial bones during the passage of the brim. The delivery was conducted with the greatest care, and with the assistance of Dr Fordyce. The mother has made a good recovery.

IV. *Dr J. W. Ballantyne* showed Dr Shibata's OBSTETRICAL POCKET "PHANTOM."

V. VALEDICTORY ADDRESS.

By the PRESIDENT, D. BERRY HART, M.D., F.R.S.E., F.R.C.P. Ed., etc.

GENTLEMEN,—In leaving the Presidential Chair, I do so with a strong appreciation of the great honour you conferred on me by electing me your President, and also one of gratitude for the very pleasant relations that have existed between us. The papers brought before us have been most valuable, and not the least gratifying feature has been the very great ability displayed by those of some of our younger Fellows,—an ability that promises great things for the future, and will, I am convinced, support and extend the high reputation our Society has already acquired.

To-night I wish to sketch briefly the history of Modern Gynæcology in its main aspects of progress, history, and present

status. Such an attempt is full of difficulty—almost, indeed, of danger—as the opinions of gynæcologists on many subjects are greatly at variance. Yet a candid statement of my opinion may be valuable in eliciting the views of others, and enabling us to consider past errors, with the best way of avoiding them for the future.

Modern Gynæcology is at present near its jubilee. One has only to glance at some of the text-books on Diseases of Women, published fifty or sixty years ago, to recognise that Gynæcology did not then exist, even when one makes allowance for the time text-book writers take, as a rule, before they realize advance in science. In Gooch's *Account of some of the most Important Diseases peculiar to Women*, published in 1831, we find the greater part of the work taken up with obstetric conditions, diseases of children, and a discussion on the plague. Polypus uteri occupies forty-seven pages, and with a few on irritable uterus, the then lecturer at St Bartholomew's, London, concludes his work.

Blundell's work (1837) is one of a very different kind. He describes uterine displacements, bladder diseases, ovarian dropsy, polypi, uterine inversion, uterine cancer, as well as functional diseases. In his treatment he is in some respects as advanced as our most modern gynæcologists. His views on the surgery of the abdomen, based on experimental research, bear the mark of undoubted genius, and it is hardly credible that in 1828 such a correct and far-seeing statement as the following could be published:[1]—

"I may be pardoned, perhaps, for endeavouring, on this occasion, to draw the notice of the profession to the following operations, all to appearance feasible, though by no means all of equal promise, stating distinctly, at the same time, that my design at present is to recommend them to *consideration* merely, and not to *practice*, except as observed above, *in cases otherwise desperate.*

1stly. *A division of both the Fallopian tubes, and even the removal of a small piece of them, so as to render them completely impervious, a fit addition apparently to the Cæsarean operation, the danger of which it would scarcely increase.*— The effect of this operation would be to prevent subsequent impregnation, without, however, destroying the sexual propensities, or the menstrual action of the womb; and as many, besides Mr Barlow's patient, have, on the Continent, recovered from the Cæsarean operation, the possibility of a second need for it should, I think, by all means be precluded. In those cases also of contracted pelvis, in which, notwithstanding the excitement of parturition in the seventh month, it is still necessary to destroy the children by opening the head, and reducing their size in order to bring them down through the pelvis, I think it would not be amiss to adopt this operation in order to produce sterility. An opening, two fingers broad, might be made above the symphysis pubis near the linea alba; the Fallopian tubes might be drawn up to this opening one after the other, and a piece of the tube might then be taken out. This

[1] Blundell's works are his *Diseases of Women*, edited by Castle, London, 1837; his *Surgery of the Abdomen*, an appendix to Ashwell's treatise on Parturition, London, 1828; *v.* also *Lancet*, 1828.

operation, much less dangerous than a delivery by perforating the head when the pelvis is highly contracted, may, I think, be safely recommended.

2ndly. *The extirpation of the healthy ovaries.*—This operation, even granting it to be safe, can scarcely in any instance be necessary, though it may be observed, by the way, that it would probably be found an effectual remedy in the worst cases of dysmenorrhœa, and in bleeding from monthly determination of the inverted womb, where the extirpation of this organ was rejected . . . .

3rdly. *The extirpation of the ovarian cyst in schirrus, combined with dropsy, or in simple dropsy,* will most probably be prevented by extensive adhesions, if the dropsical cyst be large and of long standing; but if the cyst be small, containing (as in Nathan Smith's case) a few pints only, the adhesions, it may be, will be found of small extent and easily separable. It remains to be ascertained, *by observation,* in what degree the abdominal adhesions may be divided, without an unjustifiable risk to the life of the patient. In the case of Janet Ireland, operated on by a very able surgeon, Mr Lizars of Edinburgh, the whole of the diseased mass could not, I believe, be removed from the abdomen; notwithstanding, the patient got well, gathered flesh, and was relieved of her central pains. These considerations are very encouraging, but we must *beware of rashness,* and, above all, we must be careful to select for the operation those cases only in which there is a reasonable hope.

5thly. *The removal of the cancerous womb when the ulceration first makes its appearance.*—To omit the operations performed upon the Continent, as well as those by Dr Weatherell and Mr Banner, the event of Mrs Moulden's case, hereafter detailed, has, it is presumed, clearly proved the possible success of this operation. Without the help of surgery this disease appears to be totally helpless; but of rashness, as before observed, it is necessary to beware.

6thly. *Extirpation of the puerperal uterus.*—When the Cæsarean operation is performed, or when a patient is evidently sinking after rupture of the womb, let it be remembered that the wound formed by the extirpation of womb, and which might probably be much reduced in extent by drawing the parts together with a ligature, would merely take the place of a more formidable wound: that, I mean, formed in the womb by the Cæsarean operation, and which, by the operation here performed, would, together with the uterus, be taken completely out of the body. No operation, perhaps, can be more unpromising—shall I say, more unjustifiable—*in the present state of our knowledge,* but I thought it proper to mention it. From four rabbits I removed the uterus within a few hours after delivery, after having drawn together, by means of ligatures, the parts by which they were connected to the pelvis,—I mean the vagina, broad ligaments, and Fallopian tubes. The mass removed was large enough to fill the hollow of the hand, as the rabbit is multiparous, and has two wombs of great capacity. Of these four rabbits, three, to my great surprise, recovered—the fourth dying from internal hæmorrhagy, in consequence of the detachment of the ligatures, which had been insecurely tied. A practitioner of considerable acuteness, Mr Webber of Yarmouth, informs me that, being called to an inversion of the puerperal uterus, he successfully removed it on the fifteenth day after delivery."

Thus Blundell anticipated—(1), the section of the Fallopian tubes now practised by many after Cæsarean section; (2), the extirpation of the ovaries for dysmenorrhœa and inversions, now known as Battey's operation; (3), Porro's modification of the Cæsarean section. In extirpation of the cancerous uterus he stated at the same time what is exactly the modern standpoint, "The general surgeons would, I presume, of preference remove the parts by incision above the symphysis, and a facility would thus be afforded for ascertaining the state of the abdominal viscera; but I suspect

it will be found at last that it is through the outlet of the pelvis that the parts may be removed with the fairest prospect of success."—(Castle's edition of Blundell's *Diseases of Women*, p. 185.)

No one can read Blundell's works without being impressed by his genius and wonderful intuition, and it is remarkable that so little general credit has been given him for his advances. This may have been due to a distrust of speculation unaccompanied by actual statistical results, as well as to an unfitness of the times for such advances. His environment was too much for him. His work on Gynæcology is also distinctly wanting in methods of investigation of disease, and this must have prevented the general acceptance of his views, and hindered the progress of the science. In some respects he reminds one of Lizars of Edinburgh, but Blundell was by far the greater man.

The greatest advance in Gynæcology was made by Sir James Simpson by his invention of the uterine sound and sponge tent. These instruments gave a means of diagnosis and treatment hitherto lacking, and opened up the realm of the pathology of the uterus. His original memoir on the uterine sound is a marvellous piece of work, and gives one a clear idea of the immense stride made by its use. He first points out the means then at the disposal of the specialist for gynæcological diagnosis, viz.,—(1), the state of the uterine functions; (2), the condition of the functions of the immediate viscera; (3), the existence of sympathetic mammary or spinal pains; (4), the condition of the patient's general health. Thus local examination was almost *nil;* but we of the present time are far too apt to forget that the four points so laid down are of very great importance in investigating a case, and are too much neglected for abundant local examination. Then follows his description of the sound and its use in the diagnosis of subinvolution, super-involution (conditions really discovered by it) in fibroids, etc. It is also marvellous to see how clearly Simpson had grasped the idea of the modern bimanual, as he really describes its use combined with that of the sound most accurately. Indeed, one is tempted to ask, Why Simpson did not see the limitation and danger of the sound, and the much greater value in most points of the bimanual? Such a step was, however, at that time impossible, even to such a giant as Simpson was. Genius is great, but it cannot conquer environment completely, and the time then was not ripe for this step.

This paper gave Gynæcology its first great impetus, and a perusal of it impresses one deeply with Simpson's power.

Looking back on its use from a modern standpoint, we can see that great abuses and dangers resulted from the employment of the sound, and some have urged that its limited use now shows that its original invention was a mistake, and that from its indiscriminate application more harm than good has resulted. We now know its risks, especially since our knowledge of antiseptics, and

we have been able to limit its use greatly by the extension of the bimanual, especially when performed under anæsthesia. All this, however, detracts in no way from Simpson's fame. There is an evolution in Science as in Nature, and although the former works, unlike the latter, from the complicated and perhaps dangerous, to the simple and safe, it is none the less apparently a law in our mental processes. One can look at Listerism in this same light.

The perusal of Simpson's many other papers serves to increase our admiration; and his great obstetric work, to say nothing of what he did for anæsthesia, mark him as a giant in this subject—one whose name can never fade nor have its lustre dimmed. He is the only one of whom we can say in Gynæcology, *Magna pars fuit.*

To Sims in America we owe a great advance—the discovery of the Sims' speculum. It may be urged that the use of the speculum dates from the 7th century, when Paulus Ægineta wrote of the dioptra, and that I have ignored Recamier's claims. No one can deny, however, that Sims gave us the best speculum, and the only one of any use for real operative work. The reason of this is evident. Sims observed a natural fact, viz., the dilatation of the vagina in a certain posture, and attained it artificially by the simplest means. This showed his genius—the power of observing a natural phenomenon and imitating it in the simplest way possible. And so it will be of every alleged discovery: it can only live as truth so far as it is based on real fact and in its working follows the natural mechanism. This discovery and his work on vesico-vaginal fistula and prolapsus uteri are, in my opinion, Sims' real claims to be considered one of the great founders of Gynæcology. In some respects, however, he was too much under the influence of the mechanical school. We must now pass on to higher advances, those of abdominal surgery. In this, Simpson[1] and Sims played little or no part, while Blundell could only foresee and advise what neither he nor his contemporaries during his period of active life could practise. The terrible death of the sufferer from cystic ovarian disease stirred the compassion of Keith, Wells, and Atlee, and to the indomitable work of that great trio we owe one of our noblest advances. One admires the courage of these men. They operated in a hostile and even threatening profession, on cases often hopeless from long continuance and many tappings, with many errors clinging to them as their legacy from the past; and yet from their work has come a technique which leaves little to be desired. Keith's share in all this has been great. His development of an asepsis in his operations even prior to Lister's work, and his share in the development of the peritoneal toilette,

[1] It must not be forgotten that Simpson fought most nobly and keenly for ovariotomy when most men were against it (*v.* Dr G. W. Balfour's Valedictory, *Ed. Med. Chir. Trans.*, 1883).

give him one of the highest places among the pioneers of abdominal work.

The victory won over ovariotomy made the next advance a much easier matter. I refer to the modern operative treatment of diseased uterine appendages, known as Battey's and Tait's operations. For long, gynæcologists ignored tubal disease. They did this in spite of a fair amount of pathological evidence, as one can see from Cruveilhier's Atlas, where tubercular disease was figured (1829); from Boivin and Duges' Plates, which showed hydrosalpinx and probably distended purulent tubes (1833); and, lastly, from Hooper (1832), where pyosalpinx and hydrosalpinx were distinctly figured. In late years much of this was forgotten, and gynæcological text-book writers thought they did their duty sufficiently if they figured Hooper's plate. Inflammatory pelvic disease was classed as either pelvic peritonitis or cellulitis, and the possibility of its being a tubal condition never considered by the vast mass of specialists, if indeed by any. The relation between tubal disease and peritonitis was hardly thought of in this country, and the overwhelming preponderance of inflammatory conditions posterior to the broad ligament alleged to be due to the pouch of Douglas being the deepest part of the peritoneal cavity (in the erect posture !), so that fluid gravitated there, and not as pointing to a tubal origin. The present tendency is to class most pelvic inflammatory swellings as tubal, the usual gynæcological rebound. Despite the pathological evidence already quoted and the great work of Bernutz and Goupil, well worthy of perusal at the present time, with its careful record of tubal distension followed by peritonitis and death (*v.* Meadows' *Translation*, vol. ii. pp. 97–101), nothing was done in the way of rational treatment until Battey, Hegar, and Tait opened a new field of operative work, rescued numberless women from suffering and death, and took away from Gynæcology the opprobrium of hopeless and helpless minor medication of serious disease.

Battey, as is well known, attacked the problem of such cases from the standpoint of theory—wild theory. To establish an artificial menopause was his aim, not to remove pathological organs. Yet none the less should he be denied the highest credit for what he has done. Far away from the great educational centres and opportunities for pathological investigation, he yet clearly saw that certain cases in Gynæcology were allowed to drift on to hopeless invalidism or death, often with nothing but a well-fitting pessary—the usual verbal jingle, as effective as Mrs Partington's mop in an Atlantic storm—to restore comfort and health. Battey, unlike Blundell, had the courage of his theory, and the operations he did and encouraged others to do showed that operative interference was rational and safe in such. Soon the real naked-eye pathological conditions were revealed, and Tait speedily outstripped all in his daring and ability, more

especially established the importance of tubal disease, and wrung from present pathology, abundant if tardy proof of its frequent existence. Hegar was also in this advance, and especially in tubercular disease has done great work.

Very much, however, remains to be accomplished under this head. Ultimate results, so difficult to get and requiring immense courage to publish, are not thoroughly known. The exact pathology of tubal and ovarian disease is too little known, and, undoubtedly, there has been much rash and crude work. As in all gynæcological advances, there has been fussy and meddlesome interference with women's appendages, and possibly many tubes and ovaries have been sacrificed that might well have been spared. Still, shrinkage in indications is going on, and no doubt we shall soon settle down to greater precision and a more thorough knowledge of this subject.

I am tempted to consider fully what has been done further in the surgery of the abdomen, especially advances in hepatic and renal surgery; but to take up these would be too great a tax on your patience. For the same reason I must also restrain myself from any remarks on extra-uterine gestation.

So far, then, I have merely touched the mountain-tops of our subject, and laid myself open to the criticism of attributing nearly all the advances in Gynæcology to Anglo-Saxon investigators. I must therefore consider now the outside workers, as well as those of Germany and France.

No one has had more influence for good in gynæcological operative work than Lister. When once the gynæcologist has grasped the idea of the "clean touch," he opens up to himself the realm of safe operative work. Bacteriology has explained what was hitherto inexplicable. Gynæcology at one time had sad experience of such cases as death from peritonitis after the use of the sound, tent, or stem pessary, or after some minor operation such as curetting. We now know what that means—Sepsis. It is Lister's immortal fame to have robbed obstetrics and surgery of their main terror.

France has done much for Gynæcology, and the names of Dupuytren, Recamier, Koeberlé, Bernutz, Goupil, and Péan are illustrious and famous. No French work has impressed me so much as that of Bernutz and Goupil, with its sound views on treatment, and one is amazed that its influence in this country has not been greater. Yet, I think, France should have done more. Its modern school, as represented in Pozzi's most valuable text-book, shows her, however, now thoroughly abreast of the times.

German gynæcologists, especially of late years, have greatly extended our knowledge, and to their work on cervical and perineal surgery—above all, to the courage and thoroughness with which they are trying to solve the difficult problem of the treatment of uterine cancer—we are immensely indebted. It would be

impossible even to enumerate the many illustrious names of which German Gynæcology can at present boast; but among those who are gone I may specially mention Schroeder, whose solid and enduring work has been of the greatest value, and who has founded a noteworthy school of observers. Finally, our German confrères take a leading position in scientific investigation, and their thoroughness and enthusiasm are an example to all.

In this brief sketch I have omitted many names deserving of mention. Ephraim M'Dowell and Nathan Smith, as the pioneers in ovariotomy, deserve all the praise America has lavished on them. To one living American investigator, Emmet, Gynæcology owes much. His observations on lacerations of the cervix are pathological contributions of high value, and although his operation has been frightfully abused by many, this has been done despite his strong protest. Emmet's scientific honesty is one of the glories of American Gynæcology.

So far I have merely taken up the questions of the progress of Gynæcology. Its actual history is quite another matter, so far as congratulation goes. The negative condition of knowledge in Gooch's time soon changed its quantity, and an amount of pernicious dogma and theory was let loose, from the evil effects of which we have not yet rallied. Probably the worst of these schools, as we might term them, was that of the ulcerationists, with their one simple cervical pathological lesion, and its one simple cure. We get the fullest information as to this ulceration of the cervix from J. H. Bennet's work on *Inflammation of the Uterus*. Here Bennet runs riot in the most woeful manner. Every pelvic symptom a woman had was due to ulceration of her cervix: almost every gynæcological patient had it, and there was no rest for her until the cervix had been scarred and cicatrized to a supposed normal condition. I know no more appalling nor ghastly book than Bennet's, nor any epoch in our history we should regard with more shame.

The doctrines of the extreme mechanical school are about as bad. The leading dogma in its faith is that a woman's pelvic health is all a question of the angle her uterus makes with the horizon, or depends on the angular relation between the uterine body and cervix. So simple and exact a matter is feminine comfort. As Bennet's work was the result of Recamier's speculum, so uterine displacements followed the discovery of the sound. One is almost ashamed to say that we now know that ulceration of the cervix does not exist, and has never existed. As to uterine displacements, it is notorious that a fixed position of the uterus was assumed as normal, though in reality the uterus has no fixed position, but rather an extensive range: while certain conditions considered pathological are, in fact, normal. Fortunately now, the current belief as to displacements is that their significance is slight, that few require direct treatment, and that the vast

majority are secondary to inflammatory conditions, as Schultze and Emmet have so clearly pointed out. While most have thrown off all this pernicious error, there are still some faults to be guarded against in the magnification of the significance of slight pelvic lesions, and the ignoring of the general constitutional state or neurotic diathesis. One must never forget that certain lesions are the result of normal child-birth, may exist for years without harm, be detected when the patient is below par, and erroneously considered the cause. How many a hard-worked, run-down woman, primarily handicapped with a neurotic constitution and over-weighted with the cares of maternity, is assured that all her troubles are due to a slight displacement or a minor cervical split, and is supposed to be cured by some mechanical nostrum, or by the obliteration of a cervical laceration! But I need not enlarge on a subject so wisely treated by Clifford Allbutt, and whose cure has been clearly indicated by Weir Mitchell. By all means let us give an exact opinion of pelvic lesions when we are consulted, but let us beware of overestimating or underestimating their significance, and ignoring neurosis and neurasthenia.

We see then that Gynæcology started from such a condition as one finds in Gooch—irritable uterus: as instruments for examination were invented or revived we got diseases discovered, generally at first misunderstood, and often a system of pathology based on them alone. Bennet made most diseases secondary to ulceration of the cervix, just as the displacement school explained everything as originating in a version or flexion. What saved Gynæcology mainly was the results derived from abdominal surgery, which showed us the folly of much of the previous work, as well as gave an impetus to exact anatomical and pathological investigation. What lessons, then, are we to draw from the past? But first let us not imagine for one moment that we are above the faults and follies of our predecessors: nay, that we have not fallen into worse. Every age merely changes its craze, and many modern facts in Gynæcology and the other branches of Medicine reveal us as credulous and simple as the mediæval practitioner. We can keep before us, however, the great fact that our knowledge of the nature of any disease depends on our knowledge of the development and anatomy of the organ concerned; on our information as to its functions; and, finally, on what we know of its pathology. How often has a system of elaborate medication been slain by a single fact in anatomy or pathology, and laid as prone and discredited as Goliath! Anatomical, physiological, and pathological research must be the basis of our future advances, and the test applied to all alleged discoveries. "Investigate" must be our motto. One thing further has struck me in Gynæcology, and that is, that our clinical history of disease is not quite crystallized out. This is a point worthy of our most careful attention, and in this respect we have much to learn from pure Surgery and Medicine.

Gynæcology has sprung from Medicine, and has long existed as one of its branches. Gradually it has emancipated itself, and now stands free, undoubtedly, as a branch of Surgery. Yet gynæcologists in our famous Infirmary are still linked with physicians, and do their operative work amongst them. This is unseemly, absolutely unscientific, and should be speedily put right. No general surgeon would tolerate phthisis and skin-disease patients in his ward, and yet to Gynæcology in the leading Medical School of the country half of a physician's ward is allotted. We must undoubtedly leave the physicians, bag and baggage, and establish ourselves as an independent surgical speciality.

Looking back on the past of Gynæcology, we can truly say that it has been a brilliant one, and that the future is still more full of promise. There has been much to be proud of: much, alas! that is humiliating. Yet we are thankful that always in our dark days there have been some faithful to truth and common sense, and who never bowed the knee to Moloch, but were contrariwise abusive to the supposed advances, and therefore helpful to Truth. Let all of us, even the youngest, have a healthy scepticism, and be most doubtful of any truth so evident that it has been accepted without proof.

Our special societies have a value that cannot be overestimated. Every such society should regard itself as a band of workers, or rather builders, whose duty it is, man by man, to contribute each his stone to the growth of its special science. We must resist the temptation to build more than our material warrants, and eschew all attempts to complete our ideas with tricked-out canvas, which must soon decay, and be torn down with reproach. It is given to few to make such gigantic contributions as Harvey, Simpson, and Lister, but most can at least add some fact, fill up some gap, and feel that their work, though humble, has been true,

> "One stone the more swung to her place,
> In that dread Temple of Thy Worth."

Dr Underhill, in proposing a hearty vote of thanks to Dr Hart for his valuable and interesting address, observed that valedictory addresses usually consisted of a few remarks *de omnibus rebus et quibusdam aliis;* but Dr Hart had wisely and well adopted another method, and given them a graphic historical review of the modern development of Gynæcology. He had shown them how much there was to be proud of in that evolution, and what a large share in it had been the work of the British Schools of Medicine, and had pointed out the by no means small part which had been played by members of their own Society, headed by their founder, Sir James Simpson. Had he thought fit to include in his remarks the advances which had been made in the anatomy and physiology of the generative organs in health and disease, he might well have added,

"*et quorum pars magna fui.*" Dr Hart had also warned them, by many striking illustrations from the history of the subject, of the dangers and follies which are sure to arise when practices are based upon theory without the support of adequate pathological inquiry. The address was altogether a most instructive one. He would add that their thanks were also due to Dr Hart for his wise and courteous conduct of the business of the Society, for his able and lucid summing up of their debates, and for the many admirable papers he had contributed to their meetings during his term of office.

Professor Simpson, on taking his place for the third time in the President's chair, desired to express his thanks for the kindness the Fellows had shown him in calling him to occupy the not unfamiliar seat. Since he had last occupied it the dignity of the position had been well maintained, and not least efficiently by Dr Berry Hart, who while still young had made his name known to obstetricians both in the Old World and the New, and to whom they would still look to render valuable services to science and to the Society which had delighted to have him as its President. He (Professor Simpson) was well aware that there were other Fellows who might have been called now to fill the office, but he could understand why they might be willing to have a prospective President of the Royal College of Physicians to preside over the Society, as it was but seldom that the presidency of the College fell to the lot of an obstetrician who might be expected to take an active interest in the Society's work. It was a pleasure to him, on looking round the room, to note how the seats were filled by men of a younger generation, many of whom had already done admirable work, and were well capable of making the session on which they were entering memorable for the value of its Transactions.

The retiring President again expressed his deep sense of the great courtesy and kindness he had received from the Fellows during his term of office, and the great pleasure it was to him to be succeeded by Professor Simpson.

VI. NOTE ON A CASE OF VAGINAL HYSTERECTOMY FOR CARCINOMA CERVICIS IN EARLY PREGNANCY.

By D. Berry Hart, M.D., F.R.C.P.E., F.R.S.E., etc.

The rarity of this combination has induced me to contribute this short note. So far as I am aware, only one similar case treated by radical operation has been recorded in this country, although Hofmeier and Landau have published cases abroad.

The patient whose case I wish briefly to narrate was sent to the Infirmary on August 25, 1891, by Dr Wilson of Mid-Calder. She was a married woman aged 33, and had three months

before admission a flooding at a menstrual period, with a bloody discharge for two months afterwards, and an offensive one during the month prior to admission. The rest of her history is of no special moment. On physical examination under chloroform the cervix was found enlarged, fungating, and breaking down; parametrium quite free; uterus enlarged somewhat, softened, and perfectly mobile.

There was no doubt about the cervical condition; almost none about the pregnancy; and as it was evident that it was a favourable case for radical treatment, I had no hesitation in recommending total extirpation strongly. Supra-vaginal amputation of the cervix was in my opinion contraindicated by the pregnancy, as the probability of bringing on immediate abortion seemed to me to render it inadvisable in this instance. Winter of Berlin has, however, in a recent paper on Schroeder's supra-vaginal amputations for cancer of the portio, given a case where the entire cervix was amputated in the second month of pregnancy, abortion following at the fourth month. The patient recovered, and was delivered of a living, full-time child three years afterwards, and six years after operation had no return of disease.

On September 3, I performed vaginal hysterectomy with the aid of my friend Dr J. C. Webster. I need only sketch the method I adopted, as the operative details are now well known. After careful local disinfection, the cervix was grasped with a volsella and brought well down and forwards. I then made a transverse incision in the posterior fornix a little above the cervical junction, opened the pouch of Douglas, and sutured the peritoneum and cut vaginal edge with juniper catgut. The cervix was then brought well back, the vesico-uterine pouch cut into, and the peritoneum and vaginal wall also sutured with catgut. The lateral attachments were then severed from below up as follows:—With a curved handled needle, a stout silk ligature was passed and tied, so as to command the lower portion of the parametric tissue. This ligatured portion was then cut with scissors on the uterine side, the separation of course stopping short of the uppermost part commanded by the ligature. Another ligature was then passed higher up, and the tissue similarly severed until the parametrium and lower half of the left broad ligament were freed from the uterus. I then began on the right side, and in a similar way ligatured and separated the parametric tissue and broad ligament. This allowed the uterus to be drawn outside entirely, and the upper portion of the left broad ligament to be easily ligatured and cut. The uterus now being removed, traction on the ligatures, which had been left long, enabled me to draw down the broad ligaments and carefully inspect them. All the ligatures had held perfectly, but one oozing point at the base of the right broad ligament required an additional ligature. The inner aspects of the broad ligaments were then brought together with a catgut suture, and the vagina lightly packed

with iodoform gauze. Less than a tablespoonful of blood was lost.

The patient made a good recovery, the pulse never rising above 100. When the ligatures were separating, the temperature ran up to 104° and even 105°, but fell whenever Dr Webster removed them. As yet the patient is well, but one can say nothing, of course, as to the prognosis.

I have thought it of advantage to record this case owing to its rarity. Unfortunately, cancer cases come to the specialist late in this country, but I hope that with increased knowledge on the part of the profession as well as of women themselves, we may see them early enough for operative interference.

Dr Gulland, who examined the specimen, reported as follows:—"The uterus was opened in the middle line posteriorly, and fixed in saturated solution of corrosive sublimate. The measurements were: longitudinally, from fundus to the normal os externum, 3½ inches; cavity of uterus and cervix, 3 inches; external circumference about 1½ inches below the fundus, 8 inches; the amniotic cavity was about 1½ × ¾ × ¾ inches, and the cervix was about 1¼ inches long. The placenta was situated at the fundus and on the posterior wall of the uterus.

"Growing from about ⅔ of the circumference of the vaginal aspect of the cervix, and springing mainly from the anterior lip, was a tumour of about the size of a hen's egg, of the 'cauliflower excrescence' variety. This joined the normal part of the cervix all round at an acute angle, and was separated from it by a deep groove, except in the cervical canal, where the transition was not marked in this way. In the canal about ⅔ of an inch of the cervix seemed free from the tumour, but the amount of normal tissue varied considerably at different points, and was less in the fornix than in the cervical canal. After hardening, the tumour could pretty easily be distinguished from the normal tissue of the cervix, and as far as could be made out from the specimen, all the diseased tissue seemed to be removed. Microscopically the tumour presents the characters of a carcinoma derived from the vaginal aspect of the cervix; and it is found to correspond in its distribution pretty nearly to what one expects from examining the specimen with the naked eye. It is more of an outgrowth from the cervix than an ingrowth into it, though the epithelial tubes or processes forming it do, of course, pass for some distance up into the cervical tissue proper, and on the mucous surface the tumour growth overlaps to some extent the normal mucous membrane.

"The tumour proper consists of large epithelial cells, resembling those normally seen on the vaginal aspect of the cervix, but larger. The outlines of the cells are very distinct, but there are no such processes as in the 'prickle-cells' of the vaginal epithelium. Towards the vaginal surface the cells are polygonal on section, but they never become flattened into squames except at the very

surface, whilst at the inner end of the processes invading the cervical tissue the basal cells are somewhat more cubical. Some of these invading processes are hollow, and in their lumen lie masses of leucocytes which have wandered thither between the cancer cells; others are solid, but there is no attempt to form cell-nests. The nuclei of the cancer cells are large, rounded, and contain little chromoplasm. Large numbers of the cells are multiplying by mitosis, and I have in several cases noted the irregular triple mitotic forms which Hansemann has described in cancer cells. One rarely meets degenerated nuclei except where the tumour has ulcerated. The stroma of the cancer consists of a very vascular connective tissue, whose arrangement is like that of the reticulum of adenoid tissue, and whose meshes are packed with leucocytes in all stages of growth, of reproduction by mitosis, and of decay. These are most numerous near the tumour processes, and there are almost exclusively of the variety whose granules stain with eosin. I examined a section stained by Dr W. Russell's method, and found that the basophile leucocytes, which that method demonstrates, were only present in small number. Through the normal cervical tissue are also scattered an unusually large number of leucocytes, many of which are eosinophiles. At many points on the vaginal aspect the tumour has ulcerated, and the appearances produced vary to a certain extent. Either the stroma, which, of course, closely resembles granulation tissue, and which here contains occasional large macrophages, becomes superficial, or the tumour is riddled by leucocytes which separate and destroy the cancer cells, so that appearances are produced very like those seen in the epithelium of the tonsil.

"The bloodvessels of the cervix are unusually large and numerous, and the supply to the stroma of the growth exceedingly free, though mainly effected by capillaries. There are few lymphatics in the stroma, and in the large lymphatic vessels running alongside of the cervical vessels, which contain numbers of leucocytes, mostly degenerated, I was not able to detect a single cancer cell with certainty. Nor could I see in the parts of the cervix and uterus which were examined any metastatic nodules."

Literature.

Gottschalk.—"Beitrag zur Entwicklungsgeschichte der menschlichen Placenta" (for Landau's case), *Arch. für Gynäk.*, Bd. 37, 1890.

Hofmeier.—*V. Benckiser and Hofmeier's Atlas*, Stuttgart, 1887, p. 3.

Smith, J. Greig.—"Case of Successful Removal per vaginam of a Cancerous and Pregnant Uterus," *Lancet*, 1887.

Winter.—"Ueber die Schröder'sche Supra-Vaginal Amputation bei Portio-carcinoma," *Zts. für Geburtshülfe*, Bd. xxii. Hft. 1.

EXPLANATION OF PLATE.

FIG. 1.—Sagittal mesial section through pregnant uterus and carcinoma (semi-diagrammatic); about $\frac{1}{5}$ of actual size. *u.*, uterine wall; *d.s.*, decidua serotina; *d.v.*, decidua vera; *d.r.*, decidua reflexa; *a.*, amniotic cavity; *p.c.*, posterior lip of cervix; *c.*, carcinoma (the shading indicates approximately the extent to which the cervix was invaded by the growth).

FIG. 2.—Margin of the carcinoma where it is invading normal cervical tissue. *c.*, processes of the carcinoma, some of which are hollow; *st.*, stroma of delicate fibrous tissue, infiltrated with leucocytes, especially near the cancer processes; *b.v.*, bloodvessels (only the larger vessels are indicated); *gl.*, normal cervical glands; *cerv.*, normal cervical tissue.

FIG. 3.—Transverse section of a cancerous process (unusually symmetrical) invading the mucous membrane of the cervical canal. Zeiss. DD. Oc. 4. *c.*, cancerous process; *ul.*, surface of mucous membrane denuded of epithelium; *l.*, leucocytes; *i.l.*, leucocytes invading the cancerous tissue, or which have passed through it; among those in the centre are a few degenerated cancer cells; *d.*, longitudinal section of the duct of a normal gland; *d.e.*, degenerated epithelial cells of the duct and surface of the mucous membrane; *c.t.c.*, connective tissue corpuscles.

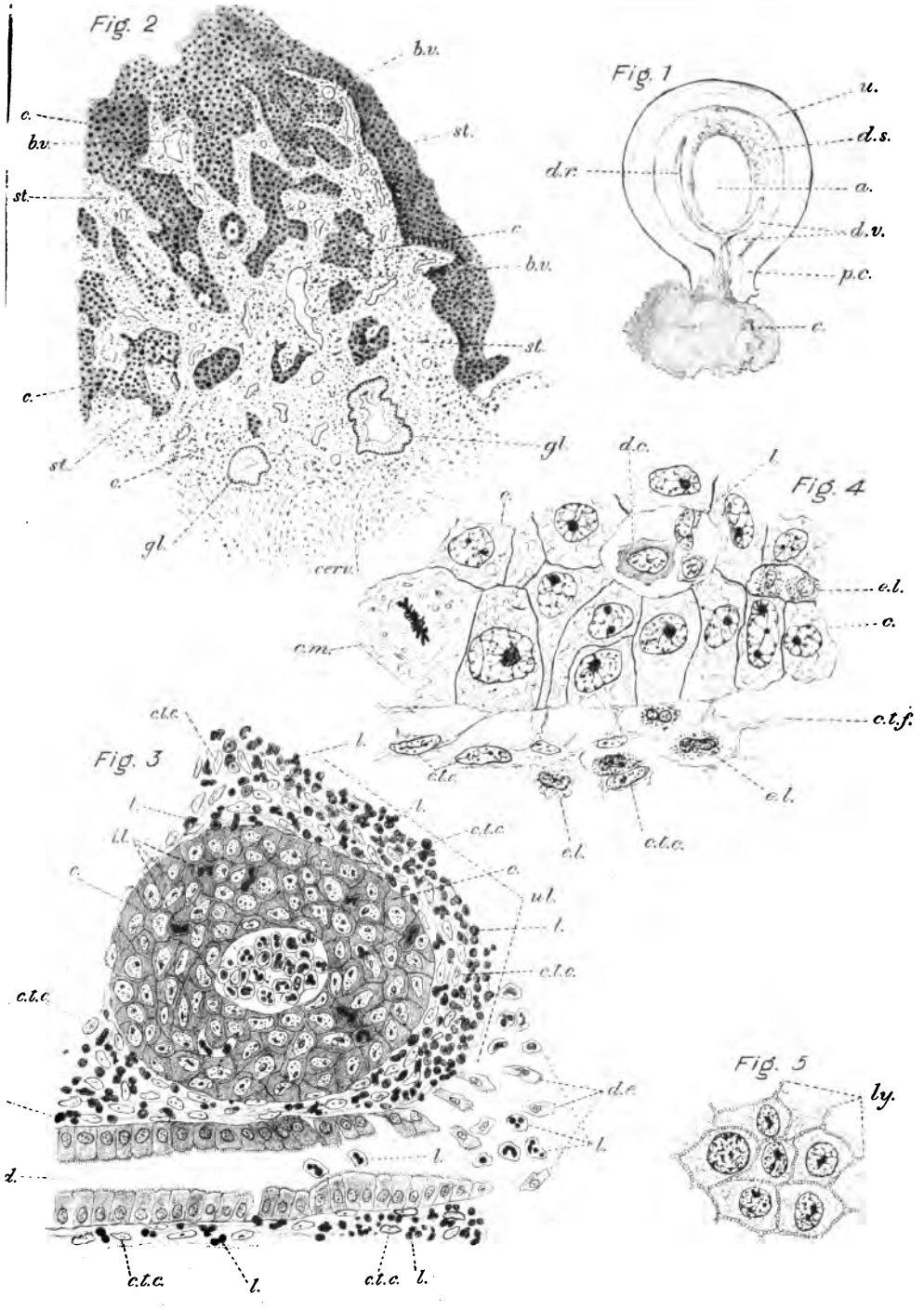
FIG. 4.—Margin of a cancer process. Zeiss., Apochr. homog. imm. 2·0 mm. Comp. Oc. 4. *c.*, cancer cells (well-marked intra-cellular network, nuclei with relatively small amount of chromoplasm); *c.m.*, cancer cell in monaster stage of mitosis; *d.c.*, degenerated cancer cell; *l.*, leucocyte; *e.l.*, eosinophile leucocyte; *c.t.c.*, connective tissue corpuscle; *c.t.f.*, connective tissue fibre.

FIG. 5.—Normal epithelium from vaginal aspect of the cervix, for comparison with Fig. 4 (same obj., etc.); *ly.*, lymph-spaces between cells, traversed by so-called "prickles."

VII. *Drs Berry Hart* and *G. L. Gulland* gave their lime-light demonstrations of DEVELOPMENT OF FEMALE GENITAL ORGANS IN EARLY FŒTAL LIFE.

The President said Dr Hart had laid them that evening under an unusual amount of obligation. He had delivered the interesting Valedictory Address of which they had expressed their admiration, and now he had inaugurated the papers of the new session with two contributions, each of which was of the greatest value. They must congratulate Dr Hart on the success that had attended his operation for the extirpation of the cancerous gravid uterus, and they had reason to congratulate the Society and science that the rare preparation had fallen into hands so competent to deal with them as those of Dr Hart and his assistant Dr Gulland. The demonstrations he had given were quite fresh and instructive, and the drawings that were being made of the beautiful sections would prove highly valuable in illustrating the development of the pelvic organs and their relations in the early embryo.

Dr J. W. Ballantyne considered that the demonstration given by Dr Hart was of exceptional interest, and he could not recollect any series of plates which gave so clear a picture of the development of the genital organs in the female fœtus. The close relations of the kidney, Mullerian ducts, Wolffian bodies and ducts, and ovaries in the early embryo served to explain many anomalous states that existed in later life, and the sections that had been



G. L. GULLAND. Del.

shown to the Society made clear how very intimate these connexions were. Dr Ballantyne felt it much easier now to understand how, for example, a displaced kidney might be found surrounded by a peritoneal coat continuous with that forming the broad ligament, as in a case of which he had recently read a description. The demonstration of the original separate condition of the two component parts of the ovary—that derived from Wolffian relics, and that originating in the epithelium of the genital ridge—made it easy to understand the differences in pathology and prognosis which existed between the various cystic and solid growths in the ovary. It would have added still further to the value of the communication if the levels of the organs with relation to the vertebræ could have been fixed; but probably this information would be forthcoming in another paper.

Dr Haultain endorsed Professor Simpson's remarks congratulating Dr Hart on the value of the lime-light demonstrations of the development of the pelvic organs. The great thickness of the tissue of the broad ligaments seemed relatively large, and he would like to know if Dr Hart could account for it, also the appearance of three openings in these ligaments; the two lateral seemed to represent transverse sections of the Mullerian ducts, but the central larger one he was at a loss to account for. He thanked Dr Hart personally for demonstrating so graphically the development of these organs, as it had always been to him a subject difficult to understand; and he was sure that when represented in pamphlet form, the plates would help many to the easy and thorough mastering of a difficult but interesting subject.

Dr Berry Hart, in reply, expressed his thanks to the Fellows. The greater thickness of the broad ligament and the number of openings was probably to be accounted for by an obliquity in the section.

VIII. ON CONGENITAL OBLITERATION OF THE BILE-DUCTS.

By JOHN THOMSON, M.D., F.R.C.P.E., Extra-Physician to the Royal Hospital for Sick Children; Lecturer on Diseases of Children, School of Medicine, Edinburgh.

WE find, scattered about in medical literature, a comparatively small number of cases which are usually described under the title "congenital obliteration, or absence, or malformation of the bile-ducts." These cases present a distinct series of symptoms, and may profitably be studied as a group by themselves.

The main clinical facts, stated very briefly, are as follows:—

The parents of the children seem healthy people, and yet in many cases it is found that they have previously had one child, or several children, similarly affected.

The children themselves are either jaundiced at birth, or they become so within the first week or two of life; otherwise they are

healthy and well-nourished. In some cases, there is a discharge of normal meconium followed by colourless motions; in others, the fæces are devoid of colour from the very first. The urine is deeply bile-stained. The jaundice is of a dark greenish tinge, and lasts till death; and the motions remain colourless. A certain proportion of the children die from umbilical hæmorrhage within the first fortnight; and, of those who survive this period, a large number suffer from spontaneous hæmorrhage from other situations. The liver steadily enlarges, and the spleen also. After living some months, the children become more or less emaciated. Fits often supervene, and death ensues in the end in a state of exhaustion from some trifling intercurrent disease.

At the post-mortem, the liver is usually found much enlarged, of a very tough consistence—due to biliary cirrhosis—and of a dark green colour, owing to the presence of numerous masses of inspissated bile in the small bile-ducts. In the great majority of cases there is complete obliteration of some part or parts of the hepatic, common or cystic ducts, or of the gall-bladder, while, with very few exceptions, implication of the bloodvessels or other tubes in the neighbourhood is conspicuous by its absence.

What is the etiology and pathology of these cases?

How are the various symptoms to be explained?

In the present paper an attempt has been made to indicate what data we have wherefrom to form an opinion on these questions, *firstly*, by accumulating all the available details of all the published cases (along with those of an original case), and, *secondly*, by looking at them in the light of other clinical facts, and of the results of recent experimental investigation.

It may be objected that the reports of individual cases gathered from miscellaneous sources, which must form the basis of such an investigation, are often defective, and possibly sometimes incorrect and misleading; but then we must remember that our arguments drawn from this source are not to be regarded as forming a chain which is no stronger than its weakest link, but that they rather resemble a line of stepping-stones, by means of which, although individually they are not all very reliable, one may safely attain to a satisfactory conclusion,—always provided one does not attempt to put too much weight in places not able to bear it.

We shall first give the facts of our own case; then proceed to the examination of other published cases of congenital obliteration of the bile-ducts, and of cases of fatal infantile jaundice with pervious ducts; and, lastly, we shall consider the pathology and probable etiology of the condition.

I. Case of Congenital Obliteration of the Bile-ducts.

Geo. Morrissey, aged 3 months, seen first on 6th July 1887 with Mr Geo. H. Temple.

Complaints.—Jaundice and whooping-cough. The former dating

from the tenth day after birth, and the latter having begun five weeks before he was seen.

Parents.—The father, an Irish tailor, is dyspeptic (he died seven months later of carcinoma of the stomach); he denies ever having had any form of venereal disease. The mother seems healthy; has had no symptoms suggestive of syphilis, and no miscarriages.

Other Children.—One, a girl about 10, is alive and healthy. Three have died in infancy—two of "bronchitis," and one of "worms." None of them were ever jaundiced or suffered from hæmorrhages, and none of them had any symptoms of congenital syphilis.

Pregnancy.—During the whole time of her pregnancy the mother was insufficiently fed, and lived largely on fruit given her by a friendly greengrocer.

Labour.—The mother says that she was under chloroform for an hour and a half, and that instruments were used "because no pains came."

At birth, the child seemed perfectly well, and was not at all jaundiced. After about ten days, he gradually became yellow, and has been so ever since. He never had any hæmorrhage from the umbilicus. He was given the breast only, and throve very well till five weeks ago when the whooping-cough began. The urine was always dark and stained his clothes yellow. During part of the first week, he passed several dark green stools ("like those of other new-born babies"), but after that time the motions became clay-coloured. They have never had the slightest yellow or brown tinge. About a week ago some dark blood was seen in the motions, and about the same time there was bleeding from the mouth and nose. The bowels have always been freely opened three or four times a day; the child has never been subject to vomiting, and has had no fits. During the last week or so, he has been getting so feeble that he makes scarcely any noise when he cries. He has never had any symptoms suggestive of congenital syphilis. He has been given grey powders and cough-mixture, but has not improved at all.

Present Condition.—The child is tolerably well-nourished, but very weak and languid. The scalp is dry and scaly, the fontanelle somewhat depressed. The skin is very deeply jaundiced all over, and has a greenish-yellow colour. The conjunctivæ are also deeply jaundiced.

Abdomen.—Marked prominence over the region of the enlarged liver, which, on percussion, is found to reach in the right mammillary line from the upper border of the fifth rib to 2½ inches below the costal margin. On palpation, the organ is felt to be very hard, and its edge is sharp. The spleen is also felt hard and large. There is a small umbilical hernia. The abdomen is otherwise normal.

Thorax.—Tolerably well-formed. Heart and lungs seem normal. Slight bronchitis.

Treatment.—The whooping-cough and bronchitis were treated in the usual way, and a few doses of grey powder were given without any effect.

Further Progress.—18*th July.* The child has been getting steadily weaker, and has lost flesh markedly. During the last few days, the stools have been very dark from the presence of blood.

20*th July.*—Rapidly getting thinner and weaker. Motions still contain much blood. On the inner side of each calf there is a small hard nodule about the size of a pea; these are not tender, and the veins round about them are enlarged. The jaundice has varied in intensity from time to time, and is now distinctly less deep than it was a week ago. The urine is dark greenish-yellow, and turbid from the presence of much amorphous deposit. No albumen, no tube-casts found; a few coloured blood-corpuscles.

21*st July.*—Died quietly at 7.30 A.M.

Post-mortem performed at 11 A.M. on 22*nd July* (had to be done hurriedly and under considerable restrictions).

Child emaciated, skin deeply jaundiced, rigor mortis passed off, abdomen distended with gas. Reddish-brown fluid oozing from nose and mouth.

Thorax.—Heart and pericardium normal; pleuræ normal, with the exception of numerous hæmorrhages from one to three lines in diameter under the pulmonary layer on both sides. Lungs partially collapsed, partially emphysematous, and both show on section numerous small hæmorrhages. A good deal of bronchitis.

Abdomen.—Peritoneum normal, no adhesions or roughness, no ascites.

Liver much enlarged (the greatest diameters being 6¾, 4, and 2 inches), weight 13 ozs.[1] General contour not much changed. Colour very dark olive-green, with fibrous bands of a yellow tint passing over the surface in all directions. Surface somewhat irregular, like that of morocco leather (on a larger scale.) Capsule not apparently thickened, edges hard and rather sharp, consistence extremely hard and tough. The surface of a section has a dark olive-green colour, and is crossed by numerous greenish yellow trabeculæ. A considerable amount of dark green fluid flows from the cut surfaces.

(Plate I. is from a drawing, and shows the morocco-like surface of the organ, as well as the condition of the gall-bladder and ducts.)

The hepatic ducts are not to be found in their usual form, but in their place there is a transverse sinus about 1¼ inches in length and ⅓ inch in diameter. On its lower surface it presents two little sacs bulging downwards (one of which has been opened in the drawing.) Its walls are thick and fibrous; its lumen is lined with a smooth membrane, and communicates by numerous

[1] That is a good deal more than twice the normal weight, *vide* Birch-Hirschfeld, Gerhardt's *Handbuch d. Kinderkrankh.*, Bd. iv., Abth. ii., p. 668.

CONGENITAL OBLITERATION OF THE BILE-DUCTS.

openings with the dilated and thick-walled ducts in the interior of the liver. There is no communicating duct between this sinus and the cystic duct, and no distinct band of fibrous tissue can be found connecting the two. The gall-bladder is rather small; it is flaccid and wrinkled, and contains about 20 minims of a brownish watery fluid, like thin mucus. The cystic duct is small (perhaps $\frac{2}{3}$ the normal diameter); it can be followed right down into the centre of the pancreas, and its lower two-thirds, or so, which is of the same calibre as the upper portion, is all there is to represent the common duct.

Owing to the hurried nature of the post-mortem, the portion of the duodenum containing the papilla was left *in situ*, but there can be little doubt that it would have been found pervious, because fluid could be readily squeezed from the gall-bladder down as far as the middle of the pancreas where the duct was severed.

The bloodvessels are quite normal. The connective tissue round the vessels and ducts is possibly a little thickened, but certainly shows no evident traces of past inflammation, and there is no roughness or other abnormality of the peritoneum covering it. The pancreas and the portion of duodenum removed are normal. The lower parts of the bowel contained much blackened fæces. The spleen is large, measuring $3 \times 1\frac{3}{4} \times \frac{7}{8}$ inches; it weighs $1\frac{1}{2}$ ozs. It is dark in colour, with a distinctly yellowish tinge, and is very tough. The Malpighian bodies are indistinct. The kidneys appear normal.

Microscopic Examination:—

Liver.—Several pieces of the right lobe were hardened in Müller's fluid, and several in spirit; and they were cut, stained, and mounted in the usual way.

On using a low power, one is struck at once by two things, —firstly, the section is traversed by a very coarse network of fibrous tissue, which is continuous with the lower layers of the capsule, and generally includes several acini in each of its meshes; and, secondly, the tissue looks as if peppered over with little dark spots. The largest of these are found to correspond in distribution with the strands of the fibrous network, while the smaller are most numerous in the inner zones of the hepatic lobules. On closer examination of the section we find the following conditions:—

The *capsule* is somewhat wavy in outline, and is thickened, but very irregularly. In some places it differs little, or not at all, from the normal in this respect, while in others it is six or eight times the usual thickness. It is thickest where it is joined by large branches of the interacinous network, and these places generally bulge somewhat on the surface. It contains numerous large vessels and sinuses filled with blood, and in its inner layers are many bile-ducts distended with green or brown masses of inspissated bile.

The *fibrous network*, already mentioned, is formed by broad

bands of fibrous tissue which pass inwards from the capsule, and branch round the lobules. Generally the meshes include from 1 to 6 acini in each (mostly 1, 2, or 3), and these are more or less distorted in shape owing to the compression they are exposed to. In some places, what appears to be only a portion of a lobule is all that occupies a mesh. The knots, so to speak, of the network are represented by masses of fibrous tissue arising from an enormous increase of the connective tissue normally present in and around the portal spaces, while the connecting strands occupy interlobular spaces. The network is by no means a complete one, and there are numerous small islets of connective tissue at points in between the lobules, and sometimes wedged into the substance of them, as it were. In stained specimens, the fibrous bands are usually more deeply coloured along their outer margins, owing to the presence of numerous proliferating cells. This fibrous tissue, like that of the capsule, contains numerous dilated bloodvessels and bile-ducts. The arteries appear to be increased in number as well as in size, they are tortuous in their course, and some of those seen on section seem to have thickened muscular walls. The bile-ducts are also tortuous and have thickened walls, and many of them contain large masses of inspissated bile. As to their distribution here, it is not so easy to make out as in the layers of the capsule, but they seem to be more numerous, on the whole, towards the periphery of the bands than in their centre.

In many places at the junction of the liver-lobules and the fibrous tissue, one sees most beautifully the arrangement of the liver-cells into parallel rows, and the formation out of them of new bile-ducts.

The *hepatic lobules* vary much in size, and also, as already noted, in shape, owing to the compression they are undergoing.

The microscopic characters of the liver-tissue vary very considerably in different portions of the organ, and even in different parts of the same section.

Firstly, a large proportion of the lobules are composed of very normal-looking cells, arranged in the usual way. The nuclei of these are well formed and colour well, and, indeed, in certain areas they absorb the carmine out of the picro-carmine stain in a very remarkably distinct way, and seem larger than usual, as if in a state of unusual activity.[1] In these acini one finds no intra-lobular cirrhosis at all.

Secondly, many of the cells even of the normal-looking lobules contain vacuoles, and some of these are so large that the cell seems transformed into a vesicle, and the nucleus is not to be seen. Many, if not all, of these vacuoles are merely the spherical spaces left from the oil having been dissolved out of fatty globules during the hardening process. Most of them do not stain with osmic acid at

[1] See Hamilton, *Journ. of Anat. and Physiol.*, xiv., 1879, p. 185.

all, but in a few it brings out a black crescent or radiating crystals.

On looking over the sections with a low power, one notices here and there smudged-looking patches which have not taken on almost any stain. These areas shade off almost imperceptibly into the surrounding tissue, and are not bordered by a line of deeply staining cells. Under a high power, they are found to be composed more or less entirely of cells which have become distended with colourless fluid until they are quite globular and much larger (2–4 times) than normal. It looks as if the vacuole had gone on enlarging till all the cell-contents, including the nucleus, had disappeared, and a simple bladder resulted. The exact localization of these areas is not always easy to determine; in some cases they occupy a segment (a quarter or so) of the circle formed by the lobule, but often their position is less distinctly defined. They seem usually free from bile-masses, even although these may be plentiful in the adjoining liver-tissue. Some of these patches appear shrivelled and small, as if in process of being absorbed and replaced by a sort of cicatrix. It seems possible that some of the islets of fibrous tissue, before alluded to, may have arisen in this way, and if so, this would account for the apparently intralobular situation of some of them.

It is very difficult to ascertain the cause of these appearances; but, judging from their situation and surroundings, one is inclined to think that they must be due in some way to the pressure exerted by the newly-formed connective tissue. It is, however, possible that the state of stagnation of the bile may in some unexplained way have to do with their causation. These areas, especially when the process is far advanced in them, are certainly strikingly similar in appearance to those figured by Beloussow in his article "On the Results of Tying the Ductus Choledochus in Animals,"[1] which he regards as little patches of localized gangrene brought about by the bursting of over-distended bile-capillaries. He found, however, that it was only during the earlier days after the operation that this appearance was met with, and that a week or two later they were replaced by fibrous cicatrices. Pick also, in his paper on the same subject,[2] gives a somewhat similar figure of a necrotic area.

Thirdly, there is a morbid change which resembles that just described in some ways and differs from it in others. Under the capsule—especially marked near the sharp edge of the liver—there is a homogeneous-looking zone which scarcely colours at all with stains. It stretches along parallel to the capsule without regard to the limits of the individual lobules, and is bordered by a richly nucleated, brightly-staining line. There are very few fragments of bile seen in it. On closer inspection this turns out to be apparently

[1] P. N. Beloussow, *Arch. für Experiment. Pathol.*, xiv., 1881, p. 200.
[2] Ernst Pick, *Zeitschr. f. Heilkunde*, xi., 1890, 2 and 3, p. 117.

an area of coagulation-necrosis, in which the cells are breaking down by atrophy and fatty change, and are being absorbed. Its situation and distribution suggest that it is probably caused by the compression exerted by the thickened capsule and other newly-formed fibrous tissue. In the part which is beginning to be affected, we find the nuclei much increased in number and very deeply stained. There are also many vacuoles. As one passes from the more healthy surrounding tissue towards the centre of the morbid area, these vacuoles increase in number and size, the nuclei rapidly lose their power of absorbing colours, and the cells become atrophied or fattily degenerated and break down. In the parts most affected, the cellular structure is difficult to make out. In thin sections, from which the cellular debris has been shaken out of this area, one sees that there is a delicate network of intercellular fibrous tissue left.

Fourthly, one of the most noticeable features of the sections is the large number of little masses of inspissated bile scattered about over them. These plugs are found, as already noted, distending many of the small bile-ducts, the largest of them being seen in those ducts which are among the fibrous tissue. Of the smaller ones, the majority are found in the inner two-thirds of the lobules, and the number of them in many places is very great. In this situation we find, on looking closer, that by far the largest number of these little fragments are not, as one might perhaps have thought at first sight, *in* the liver-cells, but lie between them, constituting, in fact, casts of the bile-capillaries, and many of those which are cut lengthways have a branched configuration.

A few of the cells, however, do seem really to contain fragments of this material inside them. We find some, for example, which have a stained nucleus and tolerably healthy-looking protoplasm, and in it one or two small round green masses. These latter, by their shape, size, and position, remind one very much of the intracellular bladders which Pfeiffer and Kupfer[1] have described as occurring in the cells of the rabbit's liver after injections with Prussian blue, and they may possibly be casts of similar cavities here.

Where larger fragments occur, the cell in which they are seems usually more or less free from stain, and without a visible nucleus. In many places, one finds several different-sized masses lying together inside what looks like a cell-wall, with only a little granular unstained matter about them, as if the damming back of the bile into the inside of the cell had caused dissolution of the ordinary cell-contents. This may probably account for the number of cells which seem to have disappeared from the inner zones of those lobules in which the bile-plugs are most numerous, the absence of which gives those areas such a ragged look under a low power.

It is difficult to see why these fragments of bile should be local-

[1] Hermann's *Handbuch der Physiologie*, Th. i. p. 226, 1883.

ized so markedly in the inner zones of the lobules. Wyss, in his observations on the histology of obstructive jaundice (in adults),[1] found that when the obstruction had only existed a short time, the cells in the inner zone were diffusely stained with bile; but that when it was of long (three years) duration, bile-plugs were met with at the periphery of the lobules. In our sections there are only a few cells that present the diffuse granular pigment described and figured by Wyss, and the cells thus affected are usually ones which form part of the wall of a bile-capillary which is distended with bile.

Spleen.—Sections of the spleen show the ordinary appearances of chronic hypertrophy of that organ.

Kidneys.—Sections of one kidney were also examined, and showed a few very fine bands of young fibrous tissue running inwards from the capsule—a very slight amount of interstitial nephritis. In other respects the organ seemed normal.

II. Other Published Cases.

The following list contains all the cases which I have been able to find reported in which the diagnosis of malformation, obliteration, or absence of the biliary passages was confirmed by a post-mortem examination. In Tables I. and II., the clinical and pathological details of these cases are tabulated for comparison.

1. West.—*Diseases of Infancy and Childhood*, eighth edition, p. 649.
2. J. H. Morgan.—*Path. Soc. Trans.*, xxix., p. 137.
3. Eustace Smith.—*Disease in Children*, third edition, p. 718.
4. Henoch.—*Lectures on Children's Diseases*, New Syd. Soc. Transl., vol. i., p. 28.
5. C. Murchison.—*Diseases of the Liver*, third edition, p. 422.
6. Wickham Legg.—*Bile, Jaundice, and Bilious Diseases*, p. 641.
7. H. Ashby.—*Pendlebury Hospital Abstracts*, 1883, p. 59.
8. H. Ashby.—*Ibid.*, 1886, p. 73.
9. Glaister.—*Lancet*, 1st March 1879, p. 293.
10. S. Wilks.—*Path. Soc. Trans.*, xiii., p. 119.
11. Harley.—*Diseases of the Liver*, p. 299.
12. Nunneley.—*Path. Soc. Trans.*, xxiii., p. 152.
13. Roth.—Virchow's *Archiv*, xliii., p. 296.
14. }
15. } C. Binz.—Virchow's *Archiv*, xxxv., p. 360.
16. }
17. Donop.—*De Ictero speciatim neonatorum*, Berlin Dissertation, 1828, p. 18.
18. C. Lotze.—*Berliner klin. Wochenschrift*, 1876, No. 30, p. 438.
19. Heschl.—*Wiener med. Wochenschrift*, 1865.

[1] O. Wyss, Virchow's *Archiv*, xxxv., p. 553.

20. } HENNIG.—*Jahrbuch für Kinderheilkunde*, ix., 1876, p. 406.
21. }
22. FREUND.—*Ibid.*, p. 178.
23. OXLEY.—*Lancet*, 1883, ii., p. 988.
24. CURSHAM.—*London Medical Gazette*, 1840, vol. ii., p. 388.
25. LOMER.—Virchow's *Archiv*, xcix., p. 130.
26. } SCHÜPPEL.—*Archiv für Heilkunde*, xi., p. 78, 1870.
27. }
28. E. GESSNER.—*Ueber congen. Verschluss der grossen Gallengänge*, Diss. Halle, 1886.
29. } KÖSTLIN.—Canstatt's *Jahresber.*, iii., p. 293.
30. }
31. } A. D. CAMPBELL.—*Northern Journal of Medicine*, Aug. 1844,
32. } p. 237.
33. ANDERSON.—*Boston Med. and Surg. Journal*, Jan. 2., 1850, p. 440.
34. } A. A. GOULD.—*Boston Med. and Surg. Journal*, Sept. 6, 1855,
35. } p. 109.
36. H. W. DEAN.—*Trans. Amer. Med. Assoc.*, vol. ii., 1858, p. 304.
37. J. BLAKE WHITE.—*American Journal of Obstetrics*, Jan. 1888, p. 48.
38. DANFORTH.—*Chicago Medical Journal*, 1870, p. 110.
39. Sir EVERARD HOME.—*Philosophical Transactions*, 1813, p. 156.
40. } JAMES BLUNDELL.—Elliotson's *Human Physiology*, 1840, p.
41. } 101 (*note*).
42. L'HOMMEAU.—*Bulletins Soc. Anat. de Paris*, 1842, xvii., p. 52.
43. JENKINS.—"On Spontaneous Umbilical Hæmorrhage," *Trans. Amer. Med. Assoc.* vol. xi., 1858.
44. A. R. SIMPSON.—*Edin. Med. and Surg. Journal*, 1860–61, p. 1045.
45. J. M. HOBSON.—*Path. Soc. Trans.*, 1882, p. 183.
46. PAUL MEYER.—*Berliner klinische Wochenschrift*, 19th April 1886, p. 255.
47. WALTER THOMAS.—*New Zealand Medical Journal*, April 1891, p. 161.
48. Dr CNOPF.—*Münchener Med. Wochenschrift*, 21st April 1891.
49. Dr CNOPF.—*Ibid.*, 28th April 1891.

To complete this list, I should mention that Dr West[1] refers to two other cases he has seen, in addition to those he gives details of—that Prof. Virchow[2] mentions his having seen one case—and that a case has been published by Michel[3] and one by Lobstein,[4] of which I have not been able to get any particulars. Trousseau[5]

[1] West, *Diseases of Infancy and Childhood*, eighth edition, p. 649.
[2] Virchow, *Gesammelte Abhandlungen für wissenschaftl. Medicin*, p. 858.
[3] Michel, *Correspondenzblatt d. Württemberg. ärztl. Vereinigung*, Stuttgart, H. 33, p. 261.
[4] Lobstein, see Meckel's *Pathologische Anatomie*, i., p. 606.
[5] Trousseau, *Clinical Medicine*, New Sydenham Soc. Transl., vol. iv., p. 317.

bega
n.

lay.

rth.

fter.

rth.

ek.

rth.

ng of

t.

rth.

rth.

rth.

lay.

ours.

ks.

rth.

rth.

after

rth.

gan	Meconit
	.....
	.....
	.....
r	Non
h	.....
ong	.....
	.....
	.....
	.....
	....
	Non
	One motion mecon
	....
	Apparently usu
	...
	....
	....
	....
	....
	....
	...
	Some dark passed af
	...
	...
	...
	...

also refers to some cases mentioned by Porchat in his thesis (1859), and I have not been able to find out whether these are among those I have tabulated. Lastly, Witzel[1] has published an account of a child with congenital obliteration of the bile-ducts in addition to a large number of other developmental abnormalities.

We shall now proceed to analyze the tabulated cases (see Table I.)

1. *Rarity of Occurrence.*—Whatever the causes are which combine to produce this lesion, it is evident that they are only very rarely found in combination, for all the reported cases do not amount to sixty in number.

2. *Health of Parents.*—The main point of special interest with regard to the parents' health is the question whether they were suffering from syphilis. The evidence has, of course, to be received with considerable reservations so far as it is negative. In twenty-nine out of the fifty cases, nothing is said about the parents that can be held to bear on this particular. In fifteen it is said that they were "healthy," and, in at least four of these, it is expressly stated that there was no history of syphilis discoverable. Mr Morgan seems to be quite certain on this point with regard to the case which he has reported. In four instances, one parent was certainly syphilitic (or had been), and probably also in a fifth. Therefore out of the ninety-six parents of these fifty children we have evidence of syphilis in five only. It certainly deserves attention that in several cases one or both parents suffered severely from some digestive derangement. It is scarcely likely that this fact can have any etiological importance, but this has been suggested as possible.[2]

3. *Other Children.*—About the other children we notice three things:—

(*a.*) In several instances there had been a large family of healthy children before the patient was born.

(*b.*) In no case is it mentioned that any of the other children had shown signs of syphilis.

(*c.*) Although in several cases the patient was the only child affected in a large family, there is evidently a very remarkable tendency for the disease to occur in more than one child of the same parents. For example, among our fifty cases we find that there twice over occur two cases in the same family (Nos. 14 and 15, 34 and 35). In another instance (No. 22) a pair of twins was jaundiced, and one of them recovered. Then in Anderson's case (No. 33) another child of the same parents suffered, we are told, from both jaundice and hæmorrhage, but recovered; and again, out of seven children in the same family, as Glaister's case (No. 9), four had died jaundiced, and two were less severely

[1] O. Witzel, *Centralbl. für Gynæcologie*, 1880, p. 561.

[2] Binz, Virchow's *Archiv*, xxxv., p. 360, and Glaister, *Lancet*, 1st March 1879, p. 293.

jaundiced and recovered; and in the case reported by Thomas (No. 47), four previous children had died with exactly the same symptoms. In the two cases before alluded to, which Dr West mentions without giving particulars, there was also a marked family history of infantile jaundice. It is interesting to note that in the cases of fatal infantile jaundice which have been found post-mortem to be accompanied by pervious bile-ducts, occurrence of the disease in several members of a family is an equally characteristic phenomenon (*v. infra*).

4. *Character of the Labour.*—This is important, because injury or exposure at the time of birth might be the exciting cause of peritonitis, and therefore is of possible etiological importance in connexion with our subject. We find, however, that there is nothing in the statistics of the table to suggest that the character of the labour can be thought of importance. In those few cases in which the labour is said to have been tedious or otherwise abnormal there is nothing in the date of the onset of the jaundice to indicate any probability of injury at the time of birth being the cause of the disease.

5. *State of the Child at Birth and Prematurity.*—The state of the infant at birth confirms the above impression, for in none of the cases (with the exception of two evidently syphilitic ones, Nos. 25 and 26) does anything morbid, except the yellow colour of the skin, seem to have been noticed.

Prematurity is mentioned five times. In none of these cases was jaundice present at birth.

6. *Sex.*—It has often been pointed out that this condition affects more boys than girls, and our table bears this out. Out of thirty-four cases in which the sex is mentioned, twenty-one were boys and thirteen girls.

7. *Symptoms.*—

(*a.*) *Onset of Jaundice.*—The exact period of the onset of the jaundice seems to have varied very much in different cases. Turning to our table we find that this fact is not mentioned in 10 cases.

that jaundice was present at birth in		9	„
„ it appeared on the day of birth in		5	„
„ „ „ second day „		9	„
„ „ „ third day „		3	„
„ „ within a week of birth in		4	„
„ „ within 1 or 2 weeks after birth in		6	„
„ „ after a fortnight or more in		3	„

The exact period of onset is, of course, a point with regard to which there are several sources of error. For example, the presence of ordinary icterus neonatorum might obscure the precise date of appearance of the more severe form of discoloration; or want of light or attention might easily lead to its presence being overlooked for several days. Still, taking such difficulties fully into account, there can be no doubt, after studying the reported cases,

that in a considerable proportion of them there was no jaundice present until several days after birth, and that the period of onset varies very much in different cases. Also, it is plainly stated in many cases that the jaundice was very faint at birth (or when first seen), and rapidly became more intense—which change suggests that the symptom was not of long standing.

These facts lead one to infer that something or other occurring at or about the time of birth has some relation to the onset of the coloration in many cases.

What period of time should elapse between the obstruction of the bile-duct and the appearance of jaundice in an infant, we do not know. Wickham Legg[1] is of opinion that the time for an adult is twenty-four to forty-eight hours. Murchison[2] says that in patients with biliary colic the yellow discoloration is observed twelve to twenty-four hours after the subjective symptoms have occurred. Little help can be got from observing the time which ligature of the common duct in the lower animals takes to produce jaundice, because this varies widely not only with the different genus operated on, but with the individual animal, and also apparently with the individual operator. In dogs it takes from a few hours[3] to three days,[4] in cats from ten to twenty days,[3 5] and in guinea-pigs it does not come on at all.

We should naturally think it possible that the action of some external agency, such as violence or cold at the time of birth, might be to blame for the appearance or aggravation of the jaundice soon after it, but this, as already seen, finds no support from facts.

The enormous change which the circulation in the liver undergoes about the time of birth constitutes the most probable explanation of the relation between the onset of jaundice and that event.

It seems very difficult to understand how a child who for months of intra-uterine life has had no bile reaching its intestines (as indicated by entire absence of colour in the fæces from the first) can be born and remain for many days unjaundiced; still this seems to have been so in Wilks' and Freund's cases (Nos. 10 and 22). Jaccoud says that in cases of long-continued obstructive jaundice when the colour passes off, this is due to the fact that the liver may under these circumstances cease to secrete bile. Can it possibly be that the cells of the child's liver, which had long ceased to secrete bile, owing to the permanent blocking of their ducts, are so stimulated by the sudden change in their circulation that their natural function begins again?

(*b.*) *Character and Progress of Jaundice.*—Even when it is

[1] Wickham Legg, *loc. cit.*, p. 257.
[2] Murchison, *loc. cit.*, p. 380.
[3] Charcot and Gombault, *Arch. de physiologie*, iii., 1876, p. 273.
[4] Frerichs, *Klinik der Leberkrankheiten*, 1858, Bd. i., p. 99.
[5] Wickham Legg, *St Bartholomew's Hosp. Rep.*, 1873, vol. ix., p. 161.

absent or only slightly marked at birth, the jaundice always becomes extremely deep sooner or later, and often is of a greenish tinge. It is sometimes noticed to vary a little in severity from day to day, but on the whole it gets steadily worse until it is as deep as it can well be. Towards the end it has sometimes been observed to become a little paler.

It is interesting to observe that in several cases (Nos. 18, 21, 29, and 30) where there is said to have been a certain amount of communication by at least one duct between the liver and the intestine (see Table III.), the jaundice was as marked as in the other cases where the common duct was entirely obliterated. These cases, in fact, form a sort of link between those of complete obliteration and the other cases of jaundice with similar clinical histories, in which pervious ducts are found at the post-mortem (*v. infra*).

(*c.*) *Urine.*—In Dr Nunneley's case (No. 12) it is stated that there was no bile-pigment in the urine. In all the other cases where the urine is described, there was apparently much bile-pigment in it. No other abnormality is noticed.

(*d.*) *Meconium.*—Meconium is to a large extent made up of matters derived from the vernix caseosa which the fœtus in utero swallows along with amniotic fluids,[1] but it also contains intestinal epithelial cells and mucus, and its dark green colour is derived from the bile. It begins to be formed early in intra-uterine life, and in a three months' fœtus, according to Zweifel, both bile-pigment and bile-acids may be detected in it. It gradually accumulates in the intestine until the whole of the lower bowel is distended by it, and at birth it amounts from 60 to 90 grammes.[2] The meconium, which is found lowest down in the bowel at birth, and which has therefore presumably been longest there, has the darkest colour, while that near the cæcum is considerably paler. So far as I know, meconium is never met with without its usual very dark green colour—even light green—except in cases in which there is severe organic disease of the liver or bile-ducts.

When we turn to Table I. we find that in ten out of the fifty cases it is either expressly stated, or else implied, that ordinary meconium, or something similar in appearance, was passed during the first few days.

Some of the infants who passed ordinary meconium were born jaundiced, but in others the discoloration was not noticed for a week or more after birth. With the exception of Köstlin's cases (Nos. 29 and 30), which indeed differ in several points from the others, it seems that in none of the cases was the dark meconium followed by even one motion of normal yellow fæces; the stools at once assumed their cream-colour or clay-colour, even if the jaundice

[1] Zweifel, *Arch. f. Gynæcol.*, vii., 1875, p. 474.

[2] Vierordt, Gerhardt's *Handb. d. Kinderkrankheiten*, second edition, vol. i., Abth. i. p. 330.

did not come on for some days later. This looks as if the disease was always in a state of considerable advancement at birth.

What is the significance of the occurrence of normal meconium in some of the cases, and of perfectly colourless motions from the first in others? When normal meconium is passed it proves that the way from the liver-cells to the bowel must have been open for some time after meconium began to be made, and it therefore excludes the possibility of the obliteration of the duct having been due solely to an arrest of development. Where the discharge is colourless from the very beginning, it points to a very early occurrence of the obstruction. Some reasons might be urged against so early an origin for the lesion, but the entire absence of colour cannot be otherwise satisfactorily explained. We cannot think it possible, for example, that bile passed into the bowel can become decolorised in time, as bile shut up in the gall-bladder sometimes does;[1] for, if so, we should have this occurring also where the liver and ducts were normal. Nor can we reasonably suppose a morbid condition of the liver to have existed before, of such a nature as to give rise to colourless bile like that secreted in congenital syphilitic cirrhosis.

(*e.*) *Motions.*—In about twenty of the cases the motions seem to have been white, greyish, or cream-coloured from the beginning, and in most of the others they became so immediately after the meconium had been passed. In a few, however, we are told that the motions sometimes contained coloured matter at a late stage of the case. These may be divided into two distinct classes,—*firstly*, those in which there was not complete obstruction to the flow of bile from the liver to the duodenum, such as cases 18, 21, 29, and 30, in which a varying amount of yellow, green, or brown matter was observed; and, *secondly*, a few in which green matter was passed along with the grey or white fæces, although the obstruction to the bile-duct must have been quite complete at the time; for example, Mr Morgan's case (No. 2), in which the motions contained greenish-brown matter after a dose of grey powder; and two other cases (Nos. 12 and 17) in which green lumps were seen, and in which no mention is made of their following the administration of mercury.

The former class requires no discussion, but the causation of the green matter (of non-hepatic origin) in the fæces in the latter class is a matter of some interest and obscurity. The subject does not seem to have been as yet very thoroughly worked out, and I have nothing new to offer in explanation of the facts; but it may be worth while to mention briefly a few facts and statements from different sources bearing on them, and these will suggest various possible explanations of the problem as it presented itself in our cases. *Firstly*, then, although no bile is entering the intestines in

[1] Courvoisier, *Casuistisch-statistische Beiträge z. Path. und Chirurg. d. Gallenwege*, Basel, 1890.

the ordinary way, it is *possible* that a slight amount of green or yellow colour may be imparted to the fæces by their being mixed with intestinal mucus which is jaundiced, just as the blood and urine are.[1] This, however, explains very little indeed. *Secondly*, It is now believed that the well-known green stools produced by the administration of mercury do not depend, as used to be held, on an increased pouring out of bile, but rather on the formation of a peculiar green compound of mercury and sulphur in the alimentary canal,[2] and Radziejewski[3] has produced green stools by giving calomel to a dog with a complete biliary fistula. In Mr Morgan's case, the green matter appeared after a dose of grey powder, so that some such explanation as this would account for it; and as the other cases most probably got mercury also, it might possibly account for them also.

Thirdly, There is another explanation which is quite tenable in some of the cases, namely,—that the colour may be due to micro-organisms. In this connexion I may refer first to L. Hermann's recent experiments.[4] He operated on a number of dogs by separating a loop of intestine entirely from the rest of the gut, sewing up the ends of it, and then establishing the lumen of the rest of the bowel by sewing the cut surfaces together. In those dogs which died after six days, the separated portion of bowel contained a brownish gelatinous fluid; while those which survived the operation several weeks had the loop of gut full of a firm greyish-green mass deceptively like fæces. This greenish material contained innumerable micro-organisms, to the action of which its colour was presumably due. When tested for bile-pigments it gave no reaction. Again, in many cases of infantile diarrhœa the intensely green colour of the stools has been shown by Lesage[5] and others to be due to the presence in enormous quantities of a peculiar chromogenous bacillus, and to have nothing to do with bile. Lastly, I have seen a case where an infant born with complete obliteration of part of the jejunum, and who up to its ninth day had passed only white motions, commenced then to have dark green stools containing large quantities of organisms (micrococci).

(*f.*) *Vomiting.*—In nine of the cases vomiting is mentioned as having occurred, but considering the frequency of this symptom in children this fact does not seem to be of any special importance.

(*g.*) *Hæmorrhages.*—The occurrence of spontaneous hæmorrhages is one of the most characteristic clinical features in these cases. In twenty-one out of the fifty—that is, in fully half of the cases

[1] Osborne, *Dublin Quarterly Med. Journal*, vol. xv., 1853, p. 106.
[2] Thudichum, *Lancet*, March 30th, 1889, p. 631.
[3] Radziejewski, *Arch. f. Anat. Phys., u. s. w.*, 1870, p. 37.
[4] L. Hermann, Pflüger's *Archiv*, xlvi., p. 93.
[5] A. Lesage, *Le Bulletin Médical*, 26th Oct. 1887; and *Arch. de physiologie norm. et path.*, 15th Feb., 1888.

which lived more than a few days—the fact of hæmorrhage having occurred from some part of the body is noted; and in all probability it may have occurred in some of the others also, although not mentioned, as the records of many of them are so meagre.

The situations of the hæmorrhages mentioned are as follows:—

Subcutaneous	in	7	of the cases.
Subconjunctival	„	1	„ „
Umbilical	„	6	„ „
From nose	„	2	„ „
Vomited	„	4	„ „
From bowel	„	8	„ „
From mouth	„	1	„ „
From lung	„	1	„ „
Into gall-bladder	„	1	„ „
From leech-bite (excessive)	„	1	„ „

A similar tendency to spontaneous hæmorrhage is well known to exist in all cases of continued obstruction of the common duct, sooner or later, and is almost equally characteristic of a number of other very different morbid conditions which are accompanied by jaundice, such as acute yellow atrophy, yellow fever, phosphorus poisoning, etc. The situations above-mentioned are pretty much the same as those from which bleeding usually occurs in those other forms of jaundice, with the exception, naturally, of the umbilicus.

The occurrence of hæmorrhages in a case of infantile jaundice is always of very serious prognostic significance, but they are not invariably followed by a fatal issue. One such case which recovered is mentioned by Anderson,[1] and another is reported by Henoch.[2] Grandidier, in his very comprehensive article on "Spontaneous Umbilical Hæmorrhage in New-born Children,"[3] mentions thirty-five cases of hæmorrhage from the navel in which the children were jaundiced, and also had ecchymoses, and of these three recovered. As indicating the close connexion between jaundice and hæmorrhage, it may be mentioned that fully two-fifths of all the cases of spontaneous umbilical hæmorrhage which Grandidier has collected occurred in jaundiced infants.

The *cause* of the hæmorrhages has never been satisfactorily explained, although many suggestions as to their mode of production have been made. The hæmatemesis commonly met with in cases of hob-nailed liver is easily accounted for by local interference with the circulation of the gastric mucous membrane; but in our cases, as also in the various other jaundiced conditions above alluded to, we have subcutaneous and other bleedings which cannot

[1] Anderson, *Boston Med. and Surg. Journal*, Jan. 2, 1850, p. 440.
[2] Henoch, *Lectures on Children's Diseases*, New Syd. Soc. Transl., vol. i. p. 27.
[3] Grandidier, *Journal f. Kinderkrankheiten*, May 1859, p. 380.

be so explained. We want a theory which will account equally well for all the different hæmorrhages in all the different morbid conditions in which they are found. The following suggestions have been made by different writers:—

i. "*Impoverishment of the blood*" is given by Dr Budd[1] as the probable cause of the hæmorrhagic tendency. Murchison[2] also regards it as due to the blood becoming "impoverished by a diminution in the proportion of the red corpuscles and fibrin;" but he observes that it is particularly seen in conjunction with cerebral symptoms and other indications of blood-poisoning. Frerichs[3] says it is due to some change in the blood and its adhesion to the walls of the vessels.

"Impoverishment" means a simple deprivation or lessening of one or more of the normal constituents of the blood; while the very sudden appearance of the hæmorrhagic tendency often observed would rather suggest the adding of something to the blood than the taking away of anything out of it, which one should have thought would more likely have been a gradual process.

ii. *The action of bile-acids in the blood on the corpuscles* is suggested by Leyden.[4] Wickham Legg objects to this, that if the bile-acids in the blood were to blame we should find hæmaturia, such as, he says, always occurs when bile-acids are injected into the circulation, and this is almost an unknown symptom in jaundice. This objection does not appear very forcible, however, when we remember that the experiments referred to were on the lower animals, and not on man, in whom the action may be quite different. Mackay[5] found hæmoglobin always in the urine of rabbits when the ductus choledochus had been ligatured, and exactly the same condition after the intravenous injection of bile or bile-acids.

A more serious objection to this theory consists in the fact that it seems to be only near the beginning of an attack of artificial obstructive jaundice in the lower animals that the blood contains any amount of bile-acids. Mackay found that in the blood of rabbits whose common duct had been tied for more than six days little or no bile-acid could be detected. We should, I think, certainly expect that in this respect man would resemble other animals; and although hæmorrhage is a very early symptom in obstructive jaundice, it is also a very late one.

iii. *A diseased state of the bloodvessels* is said by Wickham Legg[6] to precede and cause the hæmorrhages. He says that Leyden has shown that the bile-acids produce a parenchymatous degeneration

[1] Budd, *Diseases of the Liver*, second edition, 1852, p. 463.
[2] Murchison, *Diseases of the Liver*, third edition, p. 358.
[3] Frerichs, *Klinik der Leberkrankheiten*, 1858, Bd. i. p. 242.
[4] Leyden, *Beiträge zur Pathologie des Icterus*, Berlin, 1866, p. 100.
[5] J. C. H. Mackay, *Arch. für Experiment. Pathol.*, xix., 1885, p. 269.
[6] Wickham Legg, *Bile, Jaundice, and Bilious Diseases*, p. 315.

of the glands and muscles, and that the bloodvessels are probably affected in the same way. It is difficult to see how this theory can explain the clinical facts at all satisfactorily in the case of jaundice, although a similar one may very probably account for the tendency to hæmorrhage met with in cases of leucocythæmia and some other chronic diseases. The sudden onset of the hæmorrhagic tendency almost simultaneously with the discoloration of the surface of the body, which occurs in so many of the cases, seems alone almost sufficient to disprove the idea that there is an antecedent change in the walls of the vessels. It is a well-known fact that the hæmorrhages occurring in obstructive jaundice are a very early symptom (especially in children[1]); and in several of our cases (*e.g.*, Nos. 35, 36, and 43) the bleeding set in and ended fatally within two or three days of the first appearance of the jaundice. In acute yellow atrophy and in yellow fever,[2] hæmorrhage is a very early symptom also.

In several cases on our table no jaundice was observed until a week or more after birth; and it is interesting to note that no hæmorrhage, umbilical or otherwise, took place in these before the jaundice was seen, although the obstruction of the ducts had certainly been complete in some of them at an early period of intra-uterine life. It is also of interest that in no case does there appear to have been any sign of hæmorrhage having occurred during intra-uterine life.

iv. I have more than once heard it suggested that the obstruction to the outflow of the bile interfered with the hæmocyte-destroying function of the liver, and in this way conduced to hæmorrhages by causing a sort of plethora. This theory cannot, however, be seriously entertained, because there is, as a fact, no increase of the number of these corpuscles in jaundice, but rather the reverse.[3]

v. Another theory comes naturally to one's mind on reading the results of recent pathological research, and certainly, *so far as it goes*, it seems to be much more satisfactory than any of the above. It is that the hæmorrhagic tendency is caused by the presence in the blood, not of bile-acids, but of ptomaines, or some similar organic poisons, formed in the process of ordinary digestion, which the diseased liver is not able to render innocuous, as it would do if it were in a state of health.

The facts suggesting this hypothesis may be briefly stated as follows:—

Firstly, One of the recognised functions of the liver in the animal economy is to render innocuous in some way various sorts of poisons in the blood.[4] Among the poisons which it acts on thus

[1] Von Schüppel, Ziemssen's *Cyclopædia* (Eng. Transl.), ix., p. 610.
[2] Fagge, *Principles and Practice of Medicine*, vol. i. p. 258.
[3] J. C. H. Mackay, *loc. cit.*
[4] Lauder Brunton, *Pharmacology and Therapeutics*, third edition, p. 402.

are the organic ones which are formed in the alimentary canal in the process of digestion.

Secondly, It has been found by Roger[1] that this important function of the organ is closely connected with the amount of glycogen it contains, and varies accordingly, so that when the liver contains no glycogen a very much smaller dose of these organic poisons is required to produce a given result than would be necessary if the organ were healthy in this respect. This has been tested in the case of animals with artificial cirrhosis of the liver, fatty degeneration, etc.

Thirdly, It has been demonstrated by Legg,[2] and confirmed by Von Wittich, that ligature of the bile-ducts produces disappearance of glycogen from the liver, the retention of bile seeming to interfere with the proper discharge of the function of glycogen-formation in the hepatic cells.

Now, in the disease we are considering, we are, I think, justified in thinking that there is in all probability a diminution of glycogen in the liver, owing to the forced retention of bile in it, and that the organ may very likely, on this account, be letting past its portal some poisonous product of ordinary digestion which, under its usual conditions, it would have summarily disposed of.

The exact method in which a process of blood-poisoning of this sort would act in causing hæmorrhages we do not know; but it is a well-known fact, that many forms of blood-poisoning are accompanied by a tendency to spontaneous bleeding.[3]

(*h.*) *Convulsions.*—In other serious diseases accompanied by jaundice, such as yellow fever, acute yellow atrophy, and phosphorus poisoning, convulsions are a common symptom; and in chronic forms of liver-disease they often occur towards the end. In children who are subject to convulsive attacks we should expect them to be met with often in any disease of this kind; and on looking at the published cases, we find that fits are often mentioned—namely, ten times in the fifty. It is interesting to note that convulsions frequently occur in animals after ligature of the ductus choledochus.[4]

(*i.*) *Emaciation.*—Emaciation always occurs if the child lives long enough, but it is not usually an early symptom. This may be partially explained by the fact that the exclusion of all bile from the digestive process interferes to a certain extent (though not very much[5]) with the assimilation of the fatty constituents of the food which are so important to the infant economy. Probably, however, the emaciation is mainly due to the secondary organic

[1] Roger, *Gaz. des Hôp.*, No. 66, p. 525, 1887.
[2] Wickham Legg, *St Bart. Hosp. Reports*, 1873, ix., p. 178.
[3] For references on this point see Runge, *Die Krankheiten der ersten Lebenstage*, Stuttgart, 1885, p. 117.
[4] J. C. H. Mackay, *loc. cit.*
[5] Noël Paton and J. M. Balfour, *Roy. Coll. Phys. Lab. Rep.*, 1891, p. 191.

changes in the liver-tissue interfering increasingly with the other more important functions of the organ, and with the part it should play in the general metabolism of the body.

(*j*.) *Duration of Life.*—On looking over the table we find the following details:—Only one child was still-born (and it was premature); of the others,—

11 lived less than a week.
8 „ more than a week but less than a month.
14 „ from one to four months.
16 „ for upwards of four months (two—Nos. 18 and 48—into the eighth month).

Therefore, if we exclude those who died of umbilical hæmorrhage, we may say that a very large majority of the cases lived more than a month. These facts seem to indicate two things,—firstly, that the lesion is one which has not of itself a rapid deleterious influence on the general health; and, secondly, that it is not one which is apt to be accompanied by serious complications (with the exception of the hæmorrhages).

In their recent paper, "On the Composition, Flow, and Physiological Action of the Bile in Man,"[1] Drs Paton and Balfour give it as their opinion that the "bile is to be regarded rather as an excretion than as a secretion playing any essential part in digestion;" and they also find that, "even with the bile excluded from the intestine, no less than about 70 per cent. of the fats" (of the food) "are still used." The fact that infants with complete obliteration of the bile-ducts live so long as they do, seems certainly to corroborate the above opinion to some extent.

(*k*.) *Other Morbid Conditions Present.*—Unequivocal signs of congenital syphilis are stated to have been observed either during life, or post-mortem, or both, in five cases (Nos. 13, 25, 26, 46, and 48), and in one other (No. 6) the occurrence of snuffles is noted.

As already stated, there are no serious complications which are usually met with, excepting the various spontaneous hæmorrhages. The immediate cause of death in the different cases is very various. Apparently the disease causes gradual weakening, and any chance intercurrent affection carries the child off. There does not seem to be a predisposition to any special disease.

8. *Post-mortem Appearances* (see Table II.)

(A.) *Peritoneum.*—A large quantity of ascitic fluid was found in two cases (Nos. 4 and 48), a smaller amount in No. 44, and a little effusion in several others—namely, Nos. 26, 27, 12, and 25 (in the last, however, it was probably post-mortem). The presence of adhesions or localized thickenings is noted five times (Nos. 5, 14, 18, 26, and 27).

In two cases (37 and 44) there was recent peritonitis, evidently secondary.

[1] Noël Paton and J. M. Balfour, *Roy. Coll. Phys. Lab. Rep.*, 1891, p. 191.

(B.) *Liver.*

(1.) The *size* is generally, but not always, more or less increased.

This point is not mentioned	in 19	of the cases.
The liver is said not to be enlarged	„ 8	„
„ said to be small	„ 1	„
„ „ enlarged	„ 12	„
„ „ much enlarged	„ 9	„
„ „ unequally enlarged	„ 1	„

We find, as we should expect, that enlargement is more frequently noted in cases which lived a long time.

(2.) The *shape* seems usually to be unaltered, even in those cases in which the obliteration is said only to have involved one of the hepatic ducts. In one case, however (No. 25), in which only one duct was obliterated, the corresponding lobe of the liver was shrunken, and showed excess of fibrous tissue with cystic dilatation of the ducts in it, while the other lobe, the bile of which had free exit, was not affected in this way. It is interesting to note that in one of Charcot and Gombault's experiments on animals,[1] in which only one of the hepatic ducts was tied, the resulting cirrhosis was found to affect only the corresponding lobe of the liver.

(3.) The *colour* is most frequently dark green—almost always so when the children have lived long.

(4.) The *consistence* is not alluded to in 30 of the cases. Out of the 20 cases in which it is mentioned, the organ is said to have been tough in 14.

(5.) The *surface* of the organ is only mentioned 12 times; in 4 of these it was smooth, and in 8 finely granular.

(6.) The *bloodvessels* of the liver are described 20 times; in 16 they were normal, and in 4 there was obliteration of the portal vein. It is significant that all these 4 cases (Nos. 13, 14, 26, and 27) were probably syphilitic.

(C.) *Gall-bladder and Ducts.*—As these are the seat of the primary lesion in our cases, we shall examine their condition somewhat minutely.

(*a.*) Firstly, then, as to the *precise lesion* described in the various cases. Space will not allow of the exact descriptions being quoted, but an abridged account of them will be found in Table II., and a selection of them are sketched on Table III.

In the latter I have arranged, in a sort of order of sequence, diagrammatic representations on a small scale of the exact conditions of the gall-bladder, cystic, hepatic, and common ducts, and the duodenum, as described by the writers in a majority of the published cases. The others are not represented, either because they seem to have been exactly like one of those figured, or, in some cases, because so few particulars were given that it was not possible to say whether they differed or not. Where a part of the apparatus (*e.g.*, gall-bladder,

[1] Charcot and Gombault, *Archives de physiologie*, iii., 1876, p. 273, Observation xv.

cystic duct, etc.) is not mentioned in the description, I have represented it as normal. Of course, in many of the descriptions, much that one would have liked to know is left out, and what is given is not always very intelligible; but I think that the main points will be found to be fairly and accurately represented in the Table, so far as they can be ascertained.

In studying this diagram, we may look first at the

(*b.*) *Situation of the Obliteration.* We find that this varies almost indefinitely.

Among our 50 cases there are examples of almost every conceivable variety. We may divide them roughly into four groups:—

(1.) Those in which there is no passage whatever leading from the liver to the duodenum, although the gall-bladder and cystic ducts remain more or less normal.

(2.) Those in which there is at least one permeable canal leading from the liver into the gut, but no exit from the gall-bladder, or even nothing to represent that organ.

(3.) Those in which both cystic and hepatic ducts are obliterated.

(4.) Those in which the obliteration has occurred at a variable point below the junction of the cystic and hepatic ducts.

Now this great diversity in the precise situation of the lesion is a point of considerable interest, and of itself throws some light on certain aspects of the etiology. Were the obliteration due simply to an arrest of the normal process of development of the parts, as has often been suggested, we should certainly expect that in most, if not in all, of the cases the obliteration would be found in or about the same situation. Again, were the local cause of the blocking an inflammatory process set up inside the lumen of the tube by a concretion or other local source of irritation, as others have thought, we should in the same way have expected a tendency for the obliteration to be situated about the same place in different cases.

We get, therefore, at the outset an impression that the cause is one which is not localized at any "seat of election," and therefore most probably either acts on the tubes from outside, or results in a process affecting their walls for a considerable extent before actual obstruction occurs.

(*c.*) If we next look at the diagram again to see what can be learned from it as to *other secondary changes in the external excretory apparatus*, we are again struck with the great variety met with. The significance of these differences, however, are difficult to determine; and, indeed, the anatomical descriptions are scarcely sufficiently full to allow us to attach much weight to the figures in this connexion.

I shall therefore only refer to a few points of interest.

(1.) When the cases are grouped together according to whether jaundice is said to have been present at birth, or only came on later, no special difference is found in the nature of the malformation in the two groups.

(2.) We find, as might have been expected, that the most severe malformations are almost all met with in cases which had lived several months. Inflammatory action evidently goes on spreading after the obliteration is complete, and affects the rest of the ducts and the gall-bladder—at least in many cases it does so. In Dr West's case (No. 1) this was so to a marked extent. For when the child was 3 weeks old, the gall-bladder could be felt through the abdominal wall, "the size of an egg;" and, when the post-mortem took place nine or ten weeks later, there was nothing of it left but two blind sacs—one the size of a pea, and the other twice as large (see Table III.) The inflammation set up in the bile-ducts of adults by an impacted stone spreads in a similar way.[1]

(3.) Dilatation of the canal above the point of obliteration is by no means invariably present (*e.g.*, Nos. 2 and 17), although it may occur to an enormous extent (No. 23). When present, it may either take the form of a mere dilatation of the ordinary passages (Nos. 11 and 38), or there may be a more or less abrupt and saccular enlargement of the end of the tube (Nos. 33, 6, and 23.)

(4.) An obliterated duct or portion of a duct may remain as a fibrous cord or may entirely disappear.

(5.) The obliteration of the upper end of a duct does not necessarily cause the same of the lower end (Nos. 13, 16) even after the lapse of four and a half months (No. 16).

(*d.*) *The Contents of the Gall-bladder* vary very much, from "thick syrupy bile" to clear watery fluid; but we notice that they are almost always described as colourless if the child lived more than a month. In all the cases where it is definitely stated that the motions were colourless from the first (with one exception, No. 11) there was no bile found in the gall-bladder.

(D.) *Microscopic Appearances of the Liver.*—The facts given under this head are very few.

Forty of the cases seem not to have been examined microscopically; in one case examined (Nunneley's) cirrhosis is not mentioned; in the remaining 9 cases, cirrhosis was present. It seems probable that biliary cirrhosis always occurs if the child lives long enough. The only apparent exception is Nunneley's case (No. 12), in which the description is not full, and no mention is made of cirrhosis, but it is not said that it was not present.

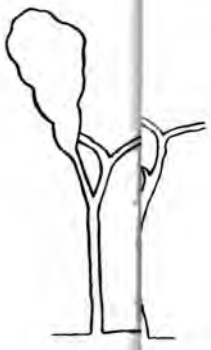
Several of the writers describe the masses of inspissated bile in the small bile-ducts, and some mention having seen fragments of the same substance inside the cells.

(E.) *The Spleen.*—In 12 of the cases the spleen is mentioned. In one of these it was small, and in one not enlarged; in all the others it was large—generally very large.

The spleen usually, though not invariably, enlarges in animals

[1] Courvoisier, *loc. cit.*

TERATION OF THE BILE-DUCTS, SHOWING THE GREAT



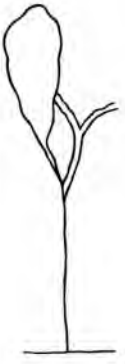
Norma Case (**21**).

Köstlin's Case (**30**).

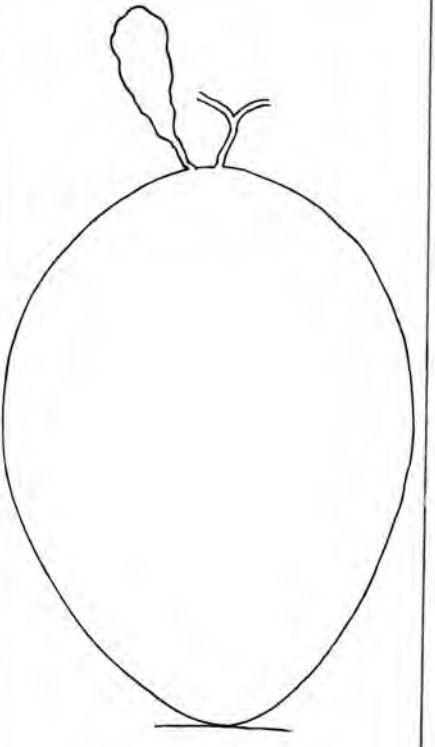
Heschl's Case (**19**).

Roth's Case (**13**).

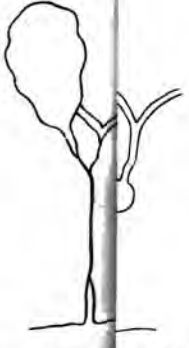
West's Case (**15**).



Blake White's Case (**37**).



Oxley's Case (**23**).



Binz's Case (**33**).

Wickham Legg's Case (**6**).

W^M CATHIE, LITH

after ligature of the common duct.[1] The cause of this does not seem to be settled; possibly it may be explained in the same way as the occurrence of the hæmorrhages (see p. 35). In 7 of the cases with enlarged spleen hæmorrhages are noted.

(F.) *Other Morbid Conditions.*—These are very various, and do not appear to have any direct connexion with the liver-affection. In many of the cases pulmonary complications seem to have been the immediate cause of death.

III. Cases of Infantile Jaundice with symptoms similar to those of Obliteration of the Bile-ducts, but with Pervious Ducts.

A considerable number of instances have been reported in which children with symptoms exactly the same as those of our cases were found, post-mortem, to have diseased livers, but in which no mention is made of the state of the bile-ducts. These cases are, of course, of no use in our present inquiry.

In a few, however, a more or less careful account of the appearances of ducts which were pervious is given. I have tabulated (Table IV.) a few of the more satisfactory of these, and it is very interesting to compare their details with those of our other cases. In doing this one is struck with the close resemblance of the two sets of cases. In fact, the resemblance is such that we cannot avoid the conclusion that they are just examples of different stages or degrees of the same disease.

The most striking point of difference is the shorter duration of life in the cases with pervious ducts (17 days average, as against more than 2½ months); and this goes to confirm the idea that these are merely earlier cases of the same morbid condition—before the blocking has been completed.

In the only one of the cases where the condition of the ducts is exactly described (Cheyne's), their walls are said to have been thickened and white and contracted "like those of arteries." Possibly this may have been so in the other cases also, for nothing is said about the walls or calibre of the ducts in any of them, and they are not stated to have been normal. The fact of the ducts in any case being permeable at the post-mortem does not, of course, prove that they were practically so during life, for it is well known that the pressure of tumours, etc., on the ducts causes complete stoppage of the passage of bile long before absolute obliteration is produced, so that, at the post-mortem, probes or a stream of water can pass through a duct that was impervious to bile during life. Also, catarrhal conditions of the mucous membrane may give rise to utter blocking during life, and yet after death there may be no actual obstruction.[2]

[1] J. C. H. Mackay, *loc. cit.*

[2] See Wickham Legg, *Bile, Jaundice, and Bilious Diseases*, p. 252.

IV. Pathology of the Lesion of the Ducts.

The lesion has been ascribed to three different morbid processes, either acting separately or in combination, namely—

1. *Peritonitis and its results*, acting on the ducts from outside, and either compressing them or being a source of inflammatory action, which spreads afterwards to their walls.
2. *An inflammatory or other lesion of the ducts themselves.*
3. *An arrest or defect of development.*

And, further, various predisposing causes have been described as accounting for these morbid processes, namely—

4. *Congenital syphilis.*
5. *Digestive disturbance on the part of the parents.*
6. *Injuries or exposure to cold*, either of the mother or child.
7. *Erysipelas* of the child.

Let us consider in order these possible factors in the etiology.

1. *Peritonitis.*—In 1838, Sir J. Y. Simpson collected together in a most interesting paper[1] a series of cases "to prove that peritonitis forms a common variety of fœtal disease, and probably constitutes one of the most frequent causes of death of the fœtus during the later months of pregnancy;" and a good deal has been written since to the same effect.

The following facts regarding it may be mentioned:—It may begin early in intra-uterine life (Sir James had found it in the third month), or during the later months of pregnancy, or it may arise within the first few days after birth. The exact time of onset must often be impossible to discover, owing to lack of symptoms. Its distribution may be general, or it may occur in patches.

It is certainly often due to syphilis; but it may also be caused, quite apart from that disease, by chill or over-exertion on the part of the mother, or, in new-born children, by erysipelas. It may be set up by many local causes in the child, such as rupture of the bladder or strangulation of the intestine, or arteritis umbilicalis.[2]

We not uncommonly meet with cases in which it has existed to a considerable extent without there having been any symptom noticed during life.[3] It may be, and often is, fatal either before or after birth. If recovered from, it often leaves adhesions, and these are a not very uncommon cause of malformations of the intestine and other viscera.[4]

There are several considerations apparently in favour of a localized form of this disease (peripylephlebitis) being the cause of obliteration of the duct in some of our cases. As we have already seen, adhesions are mentioned as having occurred in four of the

[1] Simpson, *Edinburgh Med. and Surg. Journ.*, v., 15, 1838, pp. 390–414.
[2] Max Runge, *Die Krankheiten der ersten Lebenstage*, Stuttgart, 1885, p. 84.
[3] Billard, *Traité des Maladies des Enfans*, 1837, pp. 479–483.
[4] Ahlfeld, *Archiv f. Gynæc.*, v. p. 236; and Küttner, Virchow's *Archiv*, Bd. 54, p. 37.

cases, and some fluid was found in the peritoneal cavity in a few of the others. The fact of the neighbouring bloodvessels being obliterated by fibrous tissue in several of the cases (Nos. 14, 15, 26, and 27) proves, of course, the previous occurrence of peritonitis in them.

Although, however, we have facts which *seem* to point pretty strongly to peritonitis having been the cause in a small number of the cases, we have stronger grounds for thinking that the large majority could not have been so produced. Of these I may mention a few—namely, the absence of any traces of past peritonitis in them; the fact of the lesion being limited to the gall-ducts or gall-bladder, and not affecting the bloodvessels and other neighbouring structures; and, lastly, the consideration that this theory of the etiology of these cases affords no explanation of the recurrence of the disease in families.

We must also remember that, even if peritonitis is shown to have existed, this does not prove it to have been the cause; in two of our cases (Nos. 37 and 44) there was peritonitis present which was certainly secondary to the malformation of the ducts. It seems very probable that the affection of the peritoneum is always secondary to that of the ducts, and very likely it is a result of it.

2. *Inflammatory or other affections of the ducts themselves* have been suggested as the cause by several writers. Unfortunately, microscopic examination of them does not seem to have been made in any of the cases. A few instances have been published in which a real or imaginary cause of obstruction of the bile-ducts in an infant was found, but these do not help us very much in determining the usual causation of our cases.

The lesions of the ducts which have been described as possible causes of obstruction are as follows:—

(*a.*) *Catarrh of the mucous membrane,* followed by erosion and adhesion of the bared surfaces, is naturally the morbid condition first thought of. This is a recognised cause of blocking, and even of entire obliteration of the ducts in adults.[1] In them the commonest cause of it is, of course, the irritation of a calculus; but it is also set up by syphilis, and it is said that other impurities in the blood may give rise to it. The position in which obliteration from this cause usually occurs is the pars intestinalis of the common duct.[2]

(*b.*) *Gall-stones* must be extremely rare in infants, but one case has been put on record;[3] and another case, in which calcareous concretions were met with in a young child's liver, has been described by Wronka.[4]

[1] Cornil and Ranvier, *Manual of Pathological Histology* (Transl.), vol. ii. p. 409.

[2] Von Schüppel, Ziemssen's *Cyclopædia* (Transl.), ix., p. 583.

[3] Lieutaud, *Mém. de l'Acad. Roy. de Méd.*, 1847, xiii., p. 264.

[4] Wronka, *Beiträge z. Kenntniss der angeb. Leberkrankheiten*, Inaug. Diss., Breslau, 1872.

(*c.*) *A plug of inspissated bile* was found in the bile-duct in one carefully described case,[1] and was supposed to be the cause of the obstruction which had ended in death.

(*d.*) One case of fatal obstructive jaundice in a young infant[2] has been described as due to "*spasmodic stricture of the duct;*" but the writer gives no facts in support of his hypothesis, and it is difficult to see how it can be entertained.

(*e.*) *Gummatous inflammation of the walls of the ducts* has been described by Beck[3] in one case, in which there was exudation confined to the immediate neighbourhood of this region along with syphilitic cirrhosis of the liver.

In considering these morbid conditions as to their influence in causing obliteration, the second, third, and fourth may be put aside on account of their extreme rarity or dubiousness. *Gummatous inflammation* may also be dismissed, because, although it seems a likely enough lesion to occur under favourable conditions, yet we could not expect to meet with it so often entirely apart from any signs of syphilis elsewhere, and without there being gummatous or interstitial syphilitic hepatitis at the same time.

A catarrhal condition of the ducts seems, *à priori*, quite a possible cause of the malformations met with. We do not, indeed, know of any general influence (except syphilis) capable of setting up catarrh at that period of life; but then we are familiar with the fact that ulcers for which no cause can be assigned sometimes occur in the stomach and duodenum in very young infants,[4] although they are very rare. The cicatrization of a duodenal ulcer might possibly explain the malformation in such a case as Oxley's, No. 23 (see Table III.)

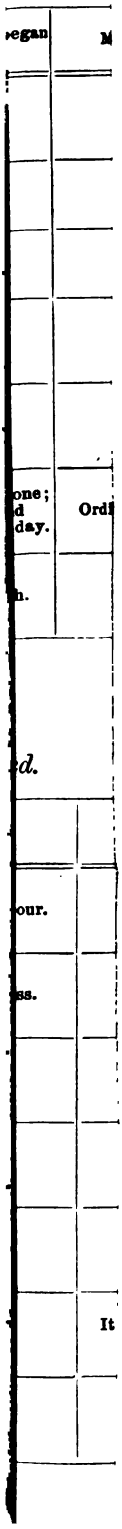
A more likely way in which catarrhal inflammation of the ducts might lead to obliteration of their lumen is that a thickening of their walls might be produced by the inflammatory action spreading to the fibrous tissue there.

It seems quite possible that a congenital malformation might exist which, although not entirely obliterating the lumen of the duct, might occasion so much irritation from interference with the free outflow of bile as to cause a chronic and progressive catarrh.

3. *Arrest or defect of development of the ducts* (Vitium primæ formationis).

When cases of the condition we are considering are referred to in general works on medicine and pathology they are usually put down to this origin, and many of the writers who have reported cases have regarded the lesion as of this nature.

[1] A. D. Campbell, *Northern Journal of Medicine*, Aug. 1844, p. 237.
[2] Waring Curran, *Medical Press and Circular*, Sept. 9th, 1868.
[3] H. Beck, *Prager medicin. Wochenschrift*, 1884; quoted in Schmidt's *Jahrbuch*, 1884, p. 204.
[4] Henoch, *loc. cit.*, vol. i. p. 66.



There are certain facts which constitute strong arguments in favour of this etiology. Of these, the following two are the most worthy of note:—

Firstly, There can be no doubt that various malformations of the liver and bile-ducts do occur which are certainly of this nature. For example, congenital absence of the gall-bladder has been frequently described,[1] and some of the cases were due to arrest of development, although many were probably of inflammatory origin. Again, Wenzel Gruber[2] has published a case in which a forked cystic duct was found; and Konitzky[3] has described another, in which the common duct had an unusually long and curved course, and opened into the middle of the horizontal portion of the duodenum, its lumen being narrowed. O. Witzel,[4] also, has published notes of an infant born with a large number of congenital abnormalities, in whom, in addition to hemicephalus, situs viscerum inversus, six fingers on each hand, etc., there was a cystic condition of the liver and complete impermeability of both the cystic and common ducts. Finally, in two of our own tabulated cases there were other developmental defects observed—namely, in Heschl's, absence of the bile-ducts in the liver-tissue; and in Professor Simpson's, want of the Spigelian and quadrate lobes.

Secondly, The frequency with which this exceedingly rare condition affects several members of the same family is very strongly in favour of this view, and indeed it seems difficult to explain it otherwise. It has been suggested[5] that this reappearance of the disease in the same family might be explained by supposing a common syphilitic taint. This suggestion, however, cannot be accepted, for we never find a tendency for an extremely rare manifestation of syphilis to recur four or five times in a family without any of the common symptoms of that disease being present at the same time.

The developmental defect may be supposed to be of various kinds. For example—(*a.*) It may be regarded as the sole cause of the obstruction—"an incomplete hollowing out of the originally solid bile-ducts" occurring, as Lotze supposes possible. (*b.*) Again, Cheyne regards the narrowing of the bile-ducts in his case to be secondary to an impermeable thickening of the beginnings of the hepatic duct. (*c.*) Lastly, we may imagine the defect to consist in a congenital narrowness or irregularity of the lumen of the ducts of such a nature as to render them unnaturally liable to disease

[1] For references see Courvoisier, *loc. cit.*, p. 139; Meckel, *Pathologische Anatomie*, i., p. 606; Förster, *Die Missbildungen des Menschen*, Jena, 1861; and Cnopf, *Münchener med. Wochenschrift*, 28th April 1891, p. 307.

[2] Wenzel Gruber, Virchow's *Archiv*, lxiii.

[3] G. Konitzky, Inaug. Diss., quoted in Virchow and Hirsch's *Jahresber.*, 1888, ii., p. 290.

[4] O. Witzel, *Centralblatt für Gynæcologie*, 1880, p. 561.

[5] Goodhart, *Atlas of Pathology*, New Sydenham Society, fasciculus v.

from its interference with the proper performance of their function.

Now, against the first of these hypotheses there are two important arguments. *Firstly*, such a developmental defect would necessarily occur at a very early period of intra-uterine life, and it is, therefore, excluded in all the cases where any coloured meconium was passed; and, *secondly*, as already pointed out, the great variety in the situation at which the obliteration occurs seems strongly against this etiology.

The last hypothesis, however, is not open to these objections, and seems to me, indeed, to afford a very necessary help in explaining the causation of a large proportion, if not all of the cases.

4. *Congenital Syphilis.*—The majority of those who have written on the pathology of this condition have ascribed it to syphilis. A few have had good reasons for so doing, but most seem to have given this explanation merely for lack of a better, or, at least, without any adequate proofs of the presence of the taint. The mere fact of the presence of cirrhosis of the liver has been erroneously regarded by several writers as a proof of syphilis.

A priori, we should certainly regard it as a very probable factor in the etiology, but when we study the details of the published cases we find very little in support of the idea. The facts in favour of syphilis as a cause are as follows:—*Firstly*, Five of the parents of the affected children were certainly syphilitic. *Secondly*, Six, possibly nine, of the children themselves showed signs of syphilis.

On the other hand, the case against syphilis is certainly a strong one. The main points are—*Firstly*, Several of those who have reported cases (notably Mr Morgan) seem *quite* sure that the parents were not syphilitic. *Secondly*, Out of the 96 parents of the 50 children whose cases are tabulated, syphilis was discovered only in 5. Of course we do not forget the difficulty of ascertaining the presence of the taint; but still, when we take into consideration the great probability that in these cases syphilis would almost always be inquired about, such a small proportion seems strongly against the idea that the lesion is a manifestation of syphilis. *Thirdly*, Although many facts are given about the other children in the same families as the patients, in no single case is it mentioned that any of them suffered from any recognised symptom of congenital syphilis. *Fourthly*, 23 of the patients lived three months or over, and yet only two of these are said to have had any symptoms which could be put down to syphilis.

Fifthly, and lastly, It is interesting to note that when we group together these six certainly, and three possibly, syphilitic cases (namely, Nos. 14, 15, 25, 26, 27, and 46, and Nos. 6, 13, and 18), and compare them with the other 41 cases, we find certain interesting points of difference. This small group contains three of the five children who were prematurely born, all but one of the cases in

which there were peritoneal adhesions, and all those in which the bloodvessels were obliterated.

These considerations justify us, I think, in believing that congenital syphilis is not an element of essential importance in the etiology of these cases.

Is it not possible that the presence of inherited syphilis may cause an unusual liability to peritonitis, so that an irritation which in a healthy infant or fœtus would set up inflammation confined to the ducts, may, in a syphilitic one, involve the peritoneum also more or less extensively?

5. *Digestive Disturbance on the part of the Parents.*—As already mentioned (p. 27), this has been seriously suggested as a possible cause by two writers, but it scarcely needs further discussion.

6. *Injuries or Exposure to Cold*, either of the mother when pregnant or of the child, are recognised causes of peritonitis in the latter. And as the circumstances attending birth are sometimes such as to occasion both, they seem worthy of consideration here. On looking over the cases, however, we find that there are no facts at all to suggest the probability that these causes of disease were in operation in any number of the cases.

7. *Erysipelas* also deserves only a short notice. In one case (No. 31) it is mentioned as having occurred and been followed by peritonitis; in another (No. 44) it may possibly have been the cause of death. There seems, however, no reason to suppose that it ever bears a causal relation to the local lesion of the bile-ducts.

Conclusion.

Let us see, then, what material we have gathered in the course of our investigation towards answering the two questions which we put at the outset.

I. *What is the etiology and pathology of these cases?*

The main conclusions we have arrived at with regard to these points may be summarized as follows:—

1. In the great majority (if not all) of the cases there is, to begin with, a congenital malformation of the bile-ducts due to defective development.

2. This malformation probably affects a considerable extent of the walls of the ducts, and may consist in narrowness of their lumen.

3. The interference with the outflow of bile thus caused, gives rise to catarrh, and finally to blocking and obliteration of the ducts, owing to the inflammatory process spreading to the walls of the ducts and gall-bladder.

4. This progressive inflammation goes on slowly spreading, the local condition getting gradually worse during many months, if the patient lives.

5. The obliterated ducts or gall-bladder, or portions of them, may

entirely disappear, not even leaving a distinct band of fibrous tissue to indicate their original position.

6. The obliteration generally becomes complete at an early, but variable period of intra-uterine life, but occasionally it does not occur till after birth.

7. In a few cases the inflammatory process spreads to the peritoneum, and possibly the presence of inherited syphilis may favour this extension. The occurrence of peritonitis is probably always secondary to the blocking of the ducts; and syphilis has nothing to do with the original lesion in them.

8. When the lumen of the duct is so far encroached upon as to obstruct the free passage of bile into the intestine, "biliary" cirrhosis of the liver begins, which as it goes on causes increasing interference with the most important functions of that important organ. The result of this is the setting up of a sort of chronic blood-poisoning which causes vomiting, spontaneous hæmorrhage, and convulsions, and gradually leads to emaciation, diminished vitality, and death.

II. *How are the various symptoms to be explained?*

A few suggestions as to the causation of some of the more interesting of the clinical phenomena may be recapitulated as follows:—

1. The reappearance of the disease in several members of the same family can only be explained by the theory that a congenital defect of development is at the root of the mischief.

2. The fact that the onset of the jaundice is not at all contemporaneous with the blocking of the bile-ducts, and usually only begins several days after birth, is best explained by taking into account the effect on the liver-cells exerted by the enormous changes in the hepatic circulation which occur at birth in new-born children.

3. The presence of coloured meconium in some cases, and of only white discharge in others, is due to the blocking of the ducts having occurred at different periods of intra-uterine life in the two groups.

4. When green matter is passed along with the colourless motions during the progress of the case, this is probably due to the chemical action of the contents of the bowel on mercury which has been administered to the child.

5. The tendency to spontaneous hæmorrhages is probably due to the occurrence of a state of chronic blood-poisoning; the arrest of the outflow of bile damaging the liver so that its functions are interfered with, and it lets past into the circulation organic products of digestion of a poisonous nature.

6. The enlargement of the spleen, the convulsions, and the vomiting, are probably more or less connected with this same condition of blood-poisoning.

7. The fact that the children live as long as they do, and do not usually become emaciated early, is to be explained by the theory

that the presence of bile in the bowel is not very necessary for digestion. When the nutrition and general health do begin to suffer, it is probably due to the interference which the secondary changes in the liver-tissue are causing with the more important functions of the organ.

Dr J. W. Ballantyne thought that the Society was specially indebted to Dr Thomson for bringing before them at such length, and in so complete a manner, this difficult and interesting fœtal condition. There were many unsolved problems in fœtal physiology and pathology which the study of congenital obliteration of the the bile-ducts opened up. The recurrence of such a malformation in successive children was extremely interesting. He had read recently in a New Zealand medical paper of a case in which a woman had given birth to five infants in succession, in all of whom there was an impervious condition of the bile-ducts. The length of time that an infant might live without bile in the intestine was another striking fact in some of these cases, and suggested new theories as to the functions of the bile in digestion. There was a great need for some symptom or sign which might enable them to diagnose between the jaundice of the new-born infant due to such grave lesions as those described by Dr Thomson and that caused by passing disturbances in the liver and duodenum. Dr Ballantyne thought that Dr Thomson was right in giving most weight to the theory of malformation rather than to that of inflammation.

Dr Thomson thanked the Society for the way in which they had received his paper.

MEETING II.—DECEMBER 9, 1891.

Professor A. R. SIMPSON, *President, in the Chair.*

I. *Dr J. W. Ballantyne* showed a DERMOID TUMOUR OF TERATOMA which had been expelled *per vaginam* during labour. The specimen had been given him by a medical friend, and the only details which could be obtained were that the woman was a primipara who had not complained in any way previous to labour, that the tumour was expelled in front of the child's head and after the rupture of the membranes; that the child, a full-time infant, showed no abnormality; and that the placenta and membranes seemed normal and intact. A detailed examination of the specimen, which was a dermoid in a bony case, with a membranous and vascular capsule and pedicle, would be presented at a future meeting of the Society.

II. *Dr J. W. Martin* showed a HYDATID MOLE. He said—The specimen I show you to-night is one of hydatid mole, which I was fortunate enough to secure at a recent case. The patient, Mrs C., 22, multipara, occupation a seller of fish, was taken ill on Thursday, the 5th November. She was sitting before the fire, when a large quantity of blood and other matter suddenly came away. It would seem that the ovum and membranes of a three months' fœtus accompanied the discharge. She had severe pain after, and the pain continued all Friday, when I was sent for. At night, at twelve o'clock, she passed a large mass of hydatid mole, together with a portion of the decidua. I washed out the uterus with Hydrarg.-perchlor. 1–3000 with warm water, and more of the mole came away. I introduced glycerine plugs, which were expelled with more fragments and blood-clots later. She still complained of severe pain. The temperature was 99°·2; the pulse rapid, 147 per minute. I feared some septic metritis. Ergot was prescribed, and other uterine styptics, and the patient was to take brandy and eggs. She was fairly comfortable on night of the 7th. She was to have morphia suppositories.

Previous History of Confinements, etc.—She had two such—one boy, who lived a night; one girl, lived six months; one miscarriage about the seventh month. The present illness, which she says is about the third month, which is hydatid mole and abortion. The previous miscarriage was brought on by a bad smell which she felt. She went home and became ill.

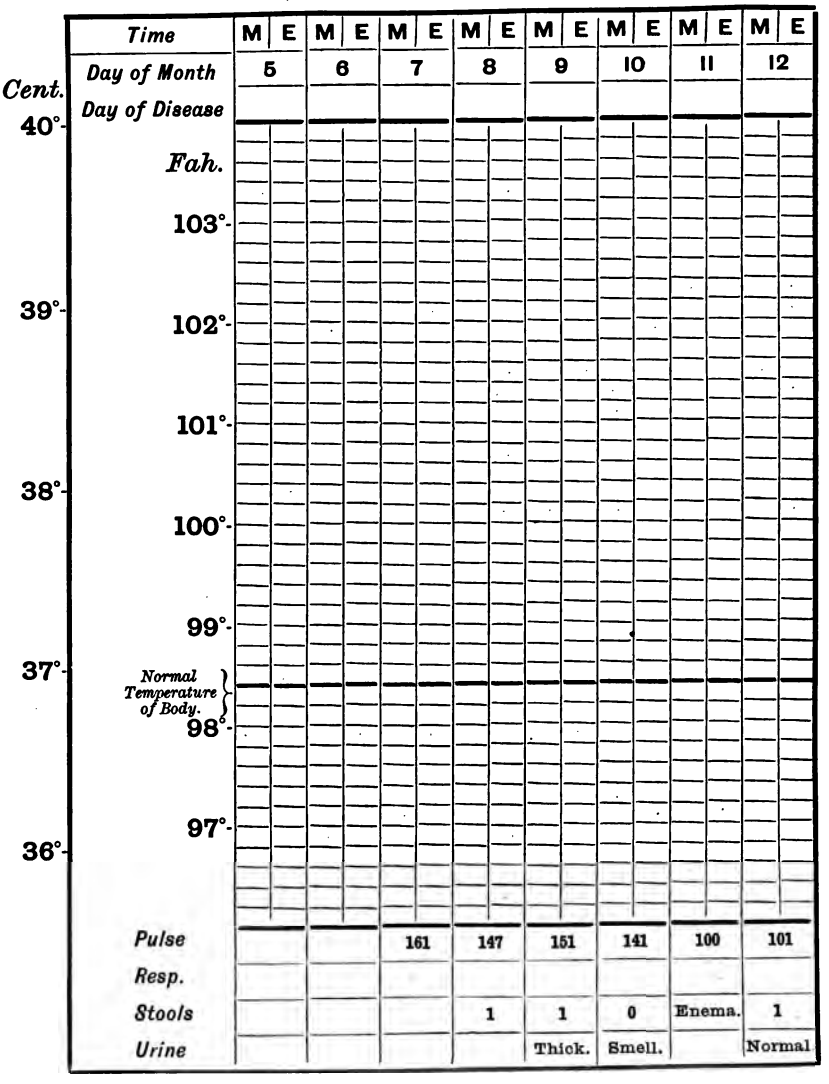
Patient stammers. She looks slightly cachectic. On the morning of the 9th she complains of pain in the abdomen; she has an earthy look. Her respirations are increased. There is a putrid discharge from the uterus. Temperature, 102°·6; pulse rapid. Fragments of clots and cysts still come away. She is washed out with Hydrarg.-perchlor. solution (1–3000). Glycerine and borax plugs with wood wadding introduced, and suppositories prescribed. Antipyrin, grs. xv., ordered.

At 4 P.M. the temperature still same. She is free of pain. The pulse is rapid and soft—141. There has been profuse sweatings during the day. Patient is inclined to sleep; complains of thirst. Poultices were applied to the abdomen for the pain; calomel and ergotin prescribed. The abdomen is somewhat hard, the uterus is tender to the touch. There is some discharge. At night the uterus washed out with Tr. iodi and warm water. Morphia suppository.

The 10th.—Temperature, 101°; pulse, 141. Patient has no complaints. Last night at two the bowels acted considerably, and the smell made her sick, and she vomited; slept after. Still some sanious discharge from uterus; washed out with Hydrarg.-perchlor. and warm water. Urine still bad; ordered Spts. ætheris nitrosi, ʒj. dose. Patient can turn herself freely. Evening temperature still over 102°; skin clammy. Patient much exhausted after washing out. Is free from pain.

Septic Metritis and Hydatid Mole.

Records of Temperature, Pulse, Respiration, Stools, and Urine from 5th day of November 1891, *in the case of Mrs C., aged* 22; *occupation, Fishseller; result, Cure.*



Wednesday.—Temperature, 100°·4; pulse, 100. Patient slept well. Vaginal douche with Hydrarg.-perchlor. Enema for bowels. Cit. of iron and quinine three times a day. Taking some light nourishment.

Thursday.—Temperature normal; pulse about 100. Complains of some pain in the back; otherwise better. To have beef-tea. Convalescing.

The pathology of the condition is a cystic degeneration of the ovum, the chorion taking on a hydatiform change, and becoming a fleshy mass composed of vesicles like grapes. The villi of the chorion are the seat of the disease, and the translucent vesicles contain fluid like liq. amnii. They vary in size, but are smaller than an acorn. They grow from the pedicle of the chorion. The decidua is diseased at the same time.

It would seem the mole is a rare disease. It is found chiefly in multiparæ, and the rapid number of pregnancies would seem a predisposing cause. Age also has some influence, though this patient is young. Syphilis is a common cause, as I should ascribe that cause to the disease in this case.

The case is generally recognised by the discharge which comes away containing vesicles; and the pain, etc., set up by the contracting uterus leads you to suspect a tumour. Early evacuation of the uterus, and, if necessary, using a curette, and swabbing out with Tr. iodi in hot water (3j. to ℥), together with the administration of ergot and uterine styptics, and the patient kept quiet, are the remedies for recovery.

LITERATURE.

SPIEGELBERG.—*Lehrbuch für Geburts.*, Lahr, 1878.
CHARPENTIER.—C.'s *Midwifery.*
STORCH.—Virchow's *Archiv*, vol. lxxii.
RUNGE.—*Centralblatt f. Gyn.*, 1880, p. 319.
PAECH.—*Gaz. Obstet.*, No. 12, 1879; and *Centralblatt f. Gyn.*, p. 431.
WEBER.—*Petersb. Med. Woch.*, 1877, Nos. 4–6.
GSCHEIDLEN.—*Archiv f. Gyn.*, vi., p. 292.

Dr J. W. Martin also showed the PLACENTA from a case of premature labour. The expulsion of the dead fœtus took place in the night, and it was at the eighth month. The child appeared to have been dead a week. The skin was peeling off, and post-mortem changes were commencing. The placenta was removed under chloroform, owing to the rigidity of the passages. It was somewhat smaller than normal. Judging from the appearance of the fœtus, particularly the cranial bones being quite loose or membranous, and that it had been dead some time in the uterus without apparent violent cause, it is the placenta of congenital syphilis. The effusions of blood, or rather extravasations, are a point of interest, and this must be due to syphilitic disease.

III. STUDIES IN FŒTAL PATHOLOGY AND TERATOLOGY.

I. The Investigation of Fœtal Disease.

By J. W. Ballantyne, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Diseases of Infancy and Childhood, and on Midwifery and Gynæcology, School of Medicine, Edinburgh; Secretary to the Edinburgh Obstetrical Society; Physician for Diseases of Women, Western Dispensary, Edinburgh.

The study of the pathology of the fœtus has an importance which has not always been fully recognised. Partly on this account, and partly by reason of the innate difficulties of the study, the subject has been allowed to lag somewhat in the rear of the more rapidly advancing branches of medical practice; it has not progressed *pari passu* with the pathology of the adult organism, it has not even kept pace with comparative morbid anatomy. The above statements might with equal justice be applied to the study of certain of the diseases of the new-born infant, maladies which it is often impossible to disassociate from those occurring during intra-uterine life. The close connexion which exists between the pathology of the fœtus and that of the new-born infant forbids the rigid separation of the two subjects, and in the following studies in fœtal pathology frequent reference must of necessity be made to the diseased conditions of the new-born. It would even seem, in some cases, that morbid conditions may exist in the fœtus without apparently influencing intra-uterine health and development; as soon, however, as the infant is born, such conditions may become active, pathological factors leading to disease, and in some cases to certain death. The potential morbidity which existed in the fœtus has become real in the new-born infant. It would seem, for example, that the fœtus may not only exist, but develop fully without the common bile-duct; but the birth of such an infant is followed sooner or later by the jaundice of the new-born (icterus neonatorum) and by death. In a still more evident manner many other fœtal anomalies and malformations only become active pathological factors in the infant after it has left the uterus of the mother. It is impossible, therefore, entirely to divorce the study of fœtal maladies from that of the diseases of the new-born infant; the one subject serves to elucidate the other.

I. It is perhaps unnecessary to bring forward evidence in support of the statement that fœtal pathology is a subject concerning which there is a real absence of knowledge and a real need for thorough research; but it may not be without service here to mention some of the ways in which this want of a rational system of fœtal diseases has made itself felt.

The *nomenclature* of fœtal maladies, and also in many cases of those of the new-born infant, is in itself evidence of the delayed

progress of this subject of medical study, and of the necessity for scientific investigation in this field of research. With few exceptions, the terminology is one based upon symptoms and not upon the pathological conditions which produce these symptoms—it is a symptomatological nomenclature. We use, in speaking of the diseases of the fœtus and new-born infant, expressions such as general dropsy, anasarca, jaundice, melæna, œdema, and apnœa—terms which we should hesitate to employ when naming the maladies of later life. In some cases even the symptomatological nomenclature is absent, and the disease is named after the first writer who described it fully, and thus it comes that such expressions as Winckel's Disease and Buhl's Disease are in common use. A terminology founded upon a symptom or upon the name of an observer is not evidence of advanced knowledge in any branch of medicine. It is not so long since another subject of medical study, gynæcology, was in a very similar condition; but no one, now-a-days, feels that his diagnosis of a gynæcological malady is complete or satisfactory when it is expressed in such terms as menorrhagia, leucorrhœa, or pelvic pain or swelling. Everyone knows that by menorrhagia is understood a symptom common to several maladies differing much from one another in their pathology, in their danger to life, and in the treatment they require, and we ought to be able to regard such conditions as dropsy of the fœtus and jaundice of the new-born in a similar manner. But at the present time it must be admitted that it is nearly, if not quite, impossible to differentiate between fœtal dropsy due to anomalies of the blood or lymphatic system and that produced by cardiac or renal disease; neither is it easy in the case of an infant to distinguish between a jaundice due to transient gastric or duodenal catarrh, and one caused by grave structural defects in the common bile-ducts. It is not even in our power sometimes to state whether or not the jaundice in a given case may be simply the physiological expression of the circulatory alterations in the liver incident to the establishment of the pulmonary respiration at the time of birth. Diagnosis is commonly delayed till the case has terminated either in recovery or in death; and there is, therefore, no possibility of any certainty in prognosis in such cases. If the jaundice be slight and evanescent, it is termed *physiological;* if it be more persistent, but eventually disappear, it is designated *catarrhal;* whilst if it result in the death of the infant it is regarded as *pernicious* icterus neonatorum, and its morbid anatomy is made manifest by a post-mortem examination. The discovery of a sign or signs, which could be relied upon for the differentiation of the various maladies of the fœtus which have œdema as a common symptom, and of the several diseases of the new-born infant which have their symptomatic expression in jaundice, would immensely help the pathologist and the physician in the diagnosis, prognosis, and treatment of such conditions. With regard to

jaundice of the new-born infant, it is surely not too much to expect that such a sign as that indicated may ultimately be found in the blood or in the urine of the patient. The remarks which have been made with regard to œdema of the fœtus and icterus neonatorum may be extended to many other so-called fœtal and infantile maladies. Melæna, for example, is in all probability only a symptom of several widely different pathological states, and apnœa or asphyxia is no doubt simply the outward expression of various morbid conditions.

All fœtal diseases have not, however, a symptomatological nomenclature; fœtal syphilis is a clear and distinct pathological entity which has had its etiology, morbid anatomy, and treatment fully investigated. Similar remarks apply to these other diseases, which are, like syphilis, transmitted from the mother to the fœtus in utero, and of which a good example is found in small-pox. Then again that large subdivision of the subject of fœtal pathology which is concerned with the description of congenital anomalies and monstrosities is gradually gaining a nomenclature which is no longer founded solely upon out-standing signs and symptoms which may be common to many widely separated pathological states. Whilst, however, a terminology founded upon symptoms alone shows that the subject to which it applies is yet in its infancy, a nomenclature based upon an imperfect or erroneous etiology and pathology is equally indicative of immaturity. Several instances of this are to be found amongst fœtal and infantile diseases,—for example, the condition which has been called fœtal rickets probably includes states which are not truly rachitic, and for which it would be better to adopt the term achondroplasia as proposed by Parrot. This line of thought might be pursued further; but enough has been said to show that in the nomenclature of fœtal maladies is to be found a proof of the chaotic state of our knowledge of intra-uterine pathology.

The high rate of fœtal and infantile *mortality* affords a second proof of retarded progress in the acquirement of accurate knowledge concerning the diseases of intra-uterine life. Whilst during the last fifty years the expectation of life has greatly increased for the adult man or woman, there has not been a similar improvement in the mortality tables of the first months and years of life. It is impossible to say exactly what is the fœtal death-rate, for accurate statistics are wanting; but it must be very high, for the frequency with which abortion occurs is well known. Indeed, it would seem that there are few women who complete their child-bearing life without having on one or more occasions had a miscarriage. Some idea of the intra-uterine death-rate may be formed from the tables furnished by Whitehead and by Priestley. Whitehead, who drew his results from a study of the poorer classes, found that of women under the age of 30 years, 37·35 per cent. had aborted, and that the ratio of abortions to pregnancies was approximately as 1 in 7; whilst

Priestley, who investigated the miscarriage rate in the well-to-do ranks of life, discovered that of women over 40 years of age, 62 per cent. had aborted, and that the ratio of abortions to pregnancies was about 1 in 4½. Abortions are not, it is true, always due to fœtal disease or death; but in many cases they are so caused, and statistics founded on the miscarriage rate give at any rate some idea of the large amount of intra-uterine morbidity which occurs in all classes of the community. Further, to these figures must be added those which indicate the number of still-births, many of which are due not to accidents during labour only, but also to fœtal disease occurring in the later months of pregnancy. Then again, the deaths which occur during the first year of life are in many cases due to congenital disease, deformity, and weakness; and with regard to them, more accurate statistics are forthcoming in the Registrar-General's returns. In the first quarter of the present year (1891), out of every 1000 infants born in the twenty-eight large towns of England, 149 died before attaining the end of the first year of life: this rate almost exactly corresponded with that in the first quarters of the preceding ten years, a fact which demonstrated that there had been no improvement in the expectation of life for infants during the decade. Whilst this was the infantile death-rate in England, it was exceeded in many other European countries, in some of which it reached the appalling rate of 300 or even of 400 per 1000. Further, a glance at the reports of medical officers of health all over the country serves to show that a high infantile mortality is their most striking feature. I quote at random from several of these reports: In one it is stated that "about one-third of the total deaths were in children under one year of age;" in another, "the most unsatisfactory item is the large proportion of deaths of infants;" in yet another, "the chief points are the low rate of zymotic mortality and the comparatively high rate of infant mortality."

Many of the deaths which occur during the first year of life must, of course, be ascribed to causes other than fœtal morbid states; but few will be prepared to assert that many of them are not directly due to conditions the result of intra-uterine disease or mal-nutrition. It may also be urged that a high fœtal and infantile death-rate is not an absolute proof of a want of knowledge of fœtal pathology and etiology, for the reason that a great part of the mortality is immediately due to neglect and ignorance on the part of parents. But whilst parental carelessness is truly responsible for many deaths amongst infants, and whilst maternal ignorance is the cause of many miscarriages, yet there is, underlying this carelessness and ignorance in the laity, a real absence of knowledge in the medical profession. The practice of the people always reflects more or less accurately the teaching of the profession. It was not till medical men fully grasped the dangers and defects of our sanitary appliances and devised means to protect the people from

them, that the preventable mortality of adult life began to diminish with most gratifying rapidity. Popular practice soon adopted the enlightened views of the profession. It is surely not altogether Utopian to look forward to a time when, with a fuller knowledge of the nature and causation of fœtal maladies, there will come a satisfactory diminution in the number of cases of intra-uterine death and disease. Did we, for instance, know the etiology of congenital malformations, we might be able to devise prophylactic measures, and so save many lives and prevent an increase in the number of comparatively helpless or hopelessly maimed human beings existing in the world. In the case of several fœtal diseases, it has already been demonstrated that this is possible. Intra-uterine syphilis is a case in point. The physician who has diagnosed the existence of syphilis in a married couple is able to assure them that if they will but adopt certain prophylactic measures, if they will put themselves under a rigid anti-syphilitic treatment with mercury, they will sooner or later be rewarded by the birth of a healthy infant. Even if there exist a fœtus in utero presumably already affected with the syphilitic taint, it has been shown that the administration of mercury to the mother, and through her to the unborn infant, will have a beneficial effect upon the fœtus, and may ward off a miscarriage, although it may not suffice to lead to the production of a living infant. Again, in certain cases, it has been shown that the administration of chlorate of potash to the mother during her pregnancy may be of such service as to enable her to give birth to a living healthy infant, although all her former gestations had terminated with distressing regularity in miscarriages. The protection of pregnant women from sources of infection during epidemics is another means which may, in many cases, result in the prevention of fœtal disease and the saving of fœtal life. Such are some of the measures which a study of fœtal disease has already placed in our hands wherewith to combat intra-uterine maladies; and in many other directions we may look for further advances in treatment the direct results of discoveries in etiology. Thus the elucidation of the laws which govern the hereditary transmission of disease, and of those which lead to the production of anomalous, deformed, or monstrous fœtuses, would undoubtedly yield results fruitful in suggestions for therapeutic measures, both prophylactic and curative. A certain amount of advance has already been made along the lines above indicated, and there are hopeful indications that we may ere long be able successfully to cope with many fœtal pathological states at present beyond our reach.

The symptomatological character of the nomenclature of fœtal disease, and the high rate of mortality during and immediately after intra-uterine life, have been adduced as evidence of the imperfect nature of the prevailing ideas upon fœtal pathology; but a third and very evident proof is to be found in the scanty and uncer-

tain information concerning the diseases of the fœtus which is to be found in medical text-books and in the lectures of medical teachers. Whilst there are certain notable exceptions to this statement, the general rule holds good, that fœtal pathology holds but a small place in the curriculum of medical study, with the inevitable result that the hard-worked general practitioner, who has already great difficulty in keeping pace with the new discoveries in medical and surgical treatment, is compelled to abandon as hopeless the attempt to understand the diseases of the fœtus, and even, to some extent, those of the young infant. The silence of the profession upon such matters has indirectly tended to foster ignorance and superstition among the laity; and I take it that the existence of so many erroneous popular beliefs concerning infantile health is a grievous blot upon the civilisation of the century now drawing so nearly to a close. Enormous strides have been made in the popularisation of the laws which govern health in the adult, and a more correct conception of the factors which govern the well-being of the child has been disseminated far and wide, but there yet remain the most erroneous notions with regard to the value of fœtal life and the nature of fœtal diseases and deformities.

II. A few words may now be said with regard to the causes which have retarded the progress of fœtal pathology and therapeutics.

There are, first, the *innate difficulties* of the subject. The diseases of the fœtus are, during their evolution, hidden from the eye, and the observer is left to judge of their characters from the appearances visible when the infant is born. It goes without saying, that such appearances may differ very markedly from those which existed during intra-uterine life; and if the disease have led to fœtal death, there will be superadded the post-mortem changes of maceration or mummification. It becomes, therefore, almost impossible to obtain a complete clinical picture of any one of the diseases or deformities which affect the fœtus; all that can be hoped for are glimpses of the condition in different cases and at different stages in its development, depending upon the progress the disease has made at the time when abortion or labour occurs. It is true that vague indications of the state of health of the fœtus may be obtained from the feelings of the pregnant woman, and from the examination of her uterus, abdomen, and mammæ. Irregularities in the rate of growth of the uterine tumour and quickening or slowing of the fœtal heart-sounds may indicate disease of the uterine contents; and cessation of the fœtal movements, along with retrogressive changes in the mammæ, and perhaps maternal peptonuria, may denote the death of the infant in utero; but these aids to diagnosis are neither very constant nor very conclusive, and they do not afford much information regarding the nature of the fœtal malady or the cause of the cessation of vitality.

The situation which the fœtus occupies in the body of the mother, whilst it renders difficult any inquiry into intra-uterine diseases, is at the same time the cause of that immunity from several pathological conditions which the fœtus enjoys. It is immediately surrounded by the liquor amnii, which, serving as a natural water-cushion, protects it from sudden shocks and jars; the uterine walls, by their growth and distensibility, allow increase in size and freedom of movement to the fœtus, whilst they shield it from harm, and maintain by their vascularity that constant temperature so needful for healthy development; and, external to the uterus, are the partly osseous, partly muscular, abdominal and pelvic walls, which serve still further to secure the safety of the embryo in utero. The intra-uterine position of the fœtus, therefore, whilst it interferes with ease of diagnosis, diminishes the risks of injury, and limits the number of diseases to which the unborn infant is liable.

Another circumstance which has interfered with the development of a system of fœtal pathology is found in the fact that until comparatively recent times *embryology and fœtal physiology have been but imperfectly understood.* Now, a knowledge of these subjects must of necessity precede any attempt to master the intricate problems of fœtal pathology. That large subdivision of intra-uterine pathology, known as teratology, made little or no progress until the microscope made possible the investigation of the development of the early embryo; and in a similar manner it was not till clear conceptions concerning fœtal nutrition, circulation, and innervation were gained that it became possible to understand many of the diseases of the fœtus. It may be confidently predicted that each advance in the study of embryology and of fœtal physiology will add to the clearness of the existing views upon fœtal disease. Reciprocally the study of intra-uterine disease will throw fresh light upon the development and the functions of the embryo. It has indeed already done so. Every fœtal disease or anomaly is an instance of a natural pathological experiment, from which much may be learnt by the attentive observer. Many hints have, for instance, been gathered from the study of anencephalic and acardiac fœtuses, which have aided the physiologist in his inquiry into the functions of the nervous and circulatory systems in the embryo; and the observation of double-monsters has been fruitful in suggestions concerning early embryological conditions. But, whilst this is so, still the correct understanding of fœtal morbid states depends upon, and has been hindered by, the rate of progress in the allied subjects of embryology and biology. Rational physiological views must precede a complete system of pathology in the fœtus as well as in the adult.

A third cause of delay in the acquisition of knowledge concerning fœtal disease is to be sought for in a totally different direction. The tendency of the observer has ever been to neglect matters of

apparently minor interest for those of major importance. *De minimis non curat lex* is a maxim which has been adopted in medicine as well as in law. The study of the diseases which affect the fœtus has been thrust into the background by the investigation of the maladies of the head of the house, of the mother of the family, and of the older children. The mercantile value, if we may so express it, of fœtal life has been put at a very low estimate compared with that of the health of the bread-winner or the mother. This was to a large extent inevitable, but it has now come to be realized that fœtal maladies have a far-reaching influence upon the health not only of the infant, but also of the mother, and are in every respect worthy of the closest study. Even at the present time, however, it is more than probable that many cases of fœtal disease pass unnoticed, and many go unrecorded simply *because they are fœtal.* There seems to be a somewhat widespread opinion still in existence that observations upon fœtal diseased states, however interesting from a theoretical point of view, are not likely to yield much information of a practically applicable kind. There can be no doubt that this method of regarding the subject of intra-uterine disease has been a potent factor in retarding progress and in delaying the establishment of a complete system of fœtal pathology and therapeutics.

III. From what has been stated, an idea will have been formed of the present state of the study of fœtal pathology and teratology, and of the lines along which the future progress of this subject may be expected to advance. Some of the methods and means by which intra-uterine disease should be investigated may now be detailed.

In the *first place,* specimens illustrating fœtal disease or malformation ought to be looked for, and, when found, ought to be thoroughly dissected. The post-mortem examination of fœtuses, of still-born infants, and of new-born infants who succumb within the first weeks of life, is a means of observation to which the attention of the medical profession has not yet been sufficiently directed. The well-marked forms of fœtal monstrosity, such as the exomphalic, the anencephalic, or the cyclopean anomaly, are not likely to escape the notice of the medical man; but it is not an uncommon thing to find that no dissection has ever been made of these interesting abnormalities. They have been bottled and catalogued and placed upon the shelves of some museum, private or public. Sometimes this even has not been done, and they have either been destroyed or kept in the medical man's own possession for the benefit of his professional friends alone. It may, however, be urged that the dissection of an anomalous fœtus destroys its external appearances, which are of great interest. Now, the external appearances are no doubt of great importance, but they can be preserved without sacrificing the valuable information which a dissection of the fœtus might give.

In all cases one or two water-colour sketches or photogravures will preserve the external characters as well as, if not better, than the keeping of the specimen in spirit, which changes the colour, and in some cases the form also, of it. But more than this can in many cases be accomplished, for sometimes it is possible to dissect the infant and also retain the outward appearance. Some years ago, in the case of a peromelous fœtus, I removed the skin, stitched it together, and stuffed it with horse hair and cotton wool, and now the specimen, *minus* skeleton and viscera, shows almost, if not quite as well as before, the general appearance of this rare monstrosity, whilst the organs and bones have been available for dissection. This stuffed specimen is now in the Obstetrical Museum of Prof. A. R. Simpson, to whom I am indebted for the suggestion of the method above described.

It is certainly wise to dissect all the cases of well-marked congenital malformation which occur, but it is also almost equally important to make post-mortem examinations of all dead or still-born infants and fœtuses whether these show any external abnormal or diseased conditions or not. This means of increasing our knowledge of fœtal pathology has been too much neglected. When carried out it has never failed to yield important information. Many teratological conditions, such as the anomalies in the form of the viscera, and the curious cases of transposition or situs inversus are not evident on inspection, and many of the diseases of the fœtus require a full dissection in order to make clear their pathological nature. The routine practice of making an autopsy upon every dead fœtus or infant could be carried out without much difficulty, save in the cases where objection was made by the parents, and in this way many anomalies might be discovered, and many obscure cases of fœtal disease might be cleared up. Especially is this true of infants who have died at or soon after birth. To quote only a few out of many examples, I may instance a case of heart disease, which proved fatal a few days after birth, another of rupture of the spleen, several of intra-cranial hæmorrhage, and two of peritonitis. In all these cases it was only by dissection that I was able to ascertain the cause of death. A word or two may not be out of place with regard to another method of investigation which may in conjunction with dissection yield good results in the study of fœtal disease and infantile death. The frozen sectional process is the method now alluded to. I have by this means investigated the relation of parts in the anencephalic fœtus, and in that with general dropsy. In the latter case the method was of special value, for it demonstrated the position of the fluid in a way that no other means could have done so efficiently. The extension of this mode of study to other forms of anomalous and diseased fœtuses could not fail to yield useful information. In the exomphalic fœtus, for instance, the relations of the viscera outside the abdomen to those inside might thus be ascertained more

definitely than by simple dissection. The microscopic investigation of the tissues of malformed or diseased fœtuses is a means of study, the importance of which must be so fully recognised that I need do no more than mention it here.

A *second* line of research in connexion with fœtal pathology is to be found in the inquiry into all the obstetrical circumstances of the case. It should never be forgotten that the membranes are fœtal structures, and that one-half of the placenta takes its origin in the chorion. This being so, it is of great importance in every case of fœtal pathology to ascertain the condition of the chorion, amnion, and placenta. Too often, unfortunately, no reference is made to any such examination; frequently the after-birth has been destroyed at once, and no notice taken of its characters. A diseased fœtus without its placenta is an imperfect specimen, and deductions drawn from it cannot be considered as conclusive, for in the missing placenta or cord may have existed the cause of the disease and death. During intra-uterine life the fœtus, the membranes, the cord, and the placenta form an organic whole, and disease of any part must react upon and affect the others. Further, the whole of the mother's organism, but more especially her uterus, and the blood circulating in its vessels, has a connexion with the growth and health of the fœtus in utero, and therefore, as far as is possible, a history of the maternal condition during pregnancy and labour ought to be ascertained. The occurrence of an infectious fever in the mother during her pregnancy may explain the conditions found in the infant at birth, and many diseased maternal states may be found to make clear the cause of abortion or miscarriage. The residence of the mother in a locality where, for example, small-pox is prevalent, may be sufficient to cause that disease in the fœtus, the mother herself enjoying the immunity which has been conferred upon her by vaccination. Possibly some obscure cases of intra-uterine death may be traced to infectious fevers which are conveyed to the fœtus by the mother, who herself shows no evidences of their existence. Again, the occurrence of traumatism during pregnancy may serve to explain some fœtal conditions, and ought to be inquired into. The history of maternal impressions ought also to be thoroughly investigated, for although the connexion between a deformity in the fœtus and a mental state in the mother is exceedingly problematical, still the matter ought for this very reason to be carefully scrutinized and the facts recorded.

As has already been said, the symptoms which occur during pregnancy, and from which an idea may be gained of the state of the fœtus, are few and vague; but still they are not to be neglected. Sometimes a careful examination reveals the existence of hydramnios, a condition very frequently complicating fœtal abnormalities and diseases. Again, irregularity in the rate of growth of the uterus, cessation or undue activity of the fœtal movements, and changes in the fœtal heart-beat, may indicate abnormal intra-uterine

states. A deficiency in the amount of the liquor amnii with its accompanying dangers may be suggested by certain physical signs. In other directions the history of the case may yield important information. The influence of the father in the production of fœtal disease and deformity is a factor which must not be forgotten. It is well known with regard to syphilis, and it is more than likely that several other diseased paternal states also may influence the fœtus. The effect of irregularities of the male element in connexion with the production of monstrosities is a matter which has not been investigated to any great extent; and it is impossible yet to foretell how far such a line of inquiry may yield good results.

Again, the whole question of heredity requires to be investigated in connexion with fœtal disease. In the case of hæmophilia it would seem as if the diseased tendency remained latent in the female until the supervention of pregnancy, and that then it appeared, but only in the fœtus, not in the other parts of the mother's organism.

The lines of research which have been already indicated are such as can be pursued by every medical man. Dissection, microscopic investigation, and the inquiry into the history of the mother's pregnancy and family history are means of investigation open to all. From sources not so generally available may be expected much that will be of interest in elucidating the problems of fœtal pathology. I allude to the *experimental methods of investigation.* Nature is constantly performing most delicate and accurate experiments in fœtal pathology, which it is possible artificially to imitate to some extent upon the lower animals. Laboratory experiments upon the passage of microbes through the placental tissues from mother to fœtus have been carried out of late years in the case of rabbits, etc., and although there is not yet a consensus of opinion upon the results, still the researches have thrown much light upon intra-uterine disease. Again, the elaborate teratogenic investigations conducted during the last twenty years by Dareste and others have thrown floods of light upon the subject of congenital malformations and monstrosities. So far these experiments have been made chiefly upon the hen's egg by altered incubation conditions, but there seems to be some prospect that the methods of Dareste may yet be extended to the artificial production of anomalies in forms other than the birds. In the laboratory also, investigations have been made upon the influence of the rise in the maternal temperature upon the fœtus, and upon the passage of chemical and bacterial bodies from the mother to the fœtus. The carrying on of experiments along such lines may be expected to yield valuable results not only as regards the pathology, but also with reference to the treatment of intra-uterine maladies. Medicinal substances may be discovered, which, like mercury and chlorate of potash, act beneficially upon the fœtus through the

maternal system. Ante-natal therapeutics may be a larger subject than is at present supposed.

To summarize: the evidences that fœtal pathology has not advanced so rapidly as the other branches of medical study are to be found,—(1), in the character of the nomenclature of fœtal disease; (2), in the high fœtal or infantile mortality which everywhere prevails; and (3), in the imperfect nature of the systems of fœtal pathology in the teaching, oral and written, of the time. The causes of this delayed rate of progress are to be discovered,—(1), in the innate difficulty of the subject; (2), in the fact that till recently the allied subjects of embryology and fœtal physiology were also in a backward condition; and (3), in the want of a due appreciation of the value of fœtal health. The remedies exist,—(1), in the complete and thorough investigation of all cases of fœtal disease and malformation; (2), in the accurate recording of the history, obstetrical and medical, of the case; and (3), in the pursuit of the experimental methods of the laboratory.

In the series of communications which I hope to lay before this Society from time to time, it is my intention to describe some of the more important fœtal maladies and teratological conditions. I am enabled to bring forward these studies chiefly through the circumstance that there have recently passed into my hands many specimens illustrating very beautifully some of the most interesting diseases and malformations which affect the fœtus. I here gladly avail myself of this opportunity of thanking the various medical men who have supplied me with the material above mentioned. My thanks are specially due to Professor A. R. Simpson for the many rare specimens which he has permitted me to dissect. I have also gratefully to acknowledge material in the form of fœtuses and clinical details of cases from Sir William Turner, Dr Barbour, Dr T. B. Darling, Dr D. Menzies, Dr Murdoch Brown, Dr James Smith, Dr Ballantyne of Dalkeith, Dr Freeland of Broxburn, Dr A. A. Martin of North Shields, Dr Miller of Sunderland, Dr T. J. Baildon of Southport, and Dr William Paterson. The specimens which have come into my possession consist of several examples of anencephaly, of encephalocele, and of exomphalos, three cases of general dropsy of the fœtus, one of peromely, one of achondroplasia, one of pseudencephaly, one of congenital club-hands and feet, one of imperforate state of anus and penis, one of intra-uterine amputation, and others illustrating minor deformities, such as non-descent of the testicle, hare-lip, etc. Upon the dissection of these diseased and malformed fœtuses are mainly founded the results to be hereafter detailed; but reference will also constantly be made to the many important papers bearing upon fœtal disease and teratology to be found in the medical literature of this and of other countries. To each of the papers will be appended a bibliographical and descriptive index of the cases referring to similar conditions to be found scattered through-

out our medical periodicals, and these lists, it is hoped, will be of use to future workers in this field of research.

The President said that whilst the prevailing epidemic and the stormy night had combined to thin the attendance on this occasion, the Fellows present must feel that they had been well rewarded for coming, in listening to the interesting communication which Dr Ballantyne had just read. The line of research on which Dr Ballantyne had entered was not only extremely interesting, it promised also to be of great value. He had done well at the outset to expose our ignorance in regard to many of the questions that have to be answered regarding intra-uterine and infantile disease. The worst thing we could do was to cover up our ignorance from ourselves by vague terminology. He (the President) was impressed with what Dr Ballantyne had said as to the relation of intra-uterine disease and malformation to the health conditions of the neonate. Besides some of the kind of cases cited by Dr Ballantyne, we could sometimes see that the child might pass through its intra-uterine existence quite comfortably with grave malformations which led to its death immediately on its birth, whilst some of the slighter malformations might be overlooked until they had led to deep disturbance of the system. A child might be born at full term apparently healthy and well formed, which wetted its cloths from time to time, so that the nurse might report all well, unless accidentally it were found that the urine could only escape in drops. In such a case there might be a constriction of the urethra leading to distension of the ureters, to hydronephrosis, and to such interference with the renal secretion that the child dies of effusions into the pleura and other serous cavities. The result of Dr Ballantyne's investigations could not fail to be of service to the profession, and especially to those of us who were engaged in obstetrical and pædiatrical practice, and it would be well that the Fellows should aid him by sending him fresh preparations for early examination.

Dr John Thomson had been much interested by Dr Ballantyne's paper, and especially by what he and Prof. Simpson had said about the potential morbidity of infants who from an early period of intra-uterine life had been malformed, but who did not suffer from their malformation until after they were born. He thought that one reason (and a very natural one) why fœtal diseases were not so interesting to many people as the ailments of children and adults was that in them one lacked the symptomatology which was such a fascinating study in other branches of medical work. Probably the want of improvement in the high infant mortality of cities was mostly due to the unhealthy condition to which the mothers of city babies were reduced by their surroundings.

Dr Rattray said he agreed with the previous speakers as to the value and suggestiveness of Dr Ballantyne's paper, which dealt

with a most interesting subject, to which far too little attention had hitherto been paid by obstetricians. Many excellent points were discussed in the paper, *inter alia*—1, the non-registering of still-born children; 2, the history of the pregnant woman; and, 3, the exciting causes of monstrosities. Dr Rattray would like, in a few words, to emphasize the importance or effect of maternal impressions, in illustration of which he related the case of a patient whom he had lately attended in her confinement. The labour, a breech case, was tedious. The quantity of liquor amnii was very great. The face of the child exactly resembled that of a pug-dog. Fortunately it was still-born. When the patient was sufficiently recovered she informed me that a pug-dog used to come into her place of business and molest her cat, to her great annoyance. So much for maternal impressions. He was anxious to get possession of the child, but was refused by the parents. A few days ago he was summoned to another case. The woman felt active movements half an hour before the labour was completed. The presentation was normal. At birth, although this infant showed no signs of life, he determined to establish respiration, but to no effect. The mother is a nervous person, and has had at least two deaths among her children, and feared she would lose this one also.

Dr Martin said he had listened with considerable interest to Dr Ballantyne's paper. He instanced the case of a child born with a blue cyst on the left eye, the result of a black eye to the mother. It formed a blue cyst, and it still remains. The child has hare-lip and cleft palate, and has also some defect about its left superior maxilla. Fœtal death was largely due to disease of the placenta, particularly syphilis, which produced many primary diseases—*e.g.*, moles, hæmorrhagic effusions, as exhibited. The symptomatology of intra-uterine life should be more studied. The birth takes place without warning to the mother. There was a great need of drugs with which to treat the mother during the intra-uterine trouble.

Dr Felkin likewise listened with extreme interest to Dr Ballantyne's paper, which presented a wide field for remarks. It was quite evident that much more should be done than has been done in the past to investigate fœtal conditions. Before referring briefly to the paper itself, Dr Felkin would like to state that Dr Rattray's remarks with regard to the cat and dog incident called to his mind a case which he had accidentally seen in the Veterinary College in Clyde Street a few weeks ago. The fœtus of a cow had been sent there having a face exactly like a bull terrier, and it was believed that the cow, before casting her calf, had been worried by a bull dog. He could not help thinking that much might be done by experimenting on and investigating the fœtal conditions in the lower animals. For instance, in extra-uterine pregnancy some observations which he had been able to make when abroad had proved to his own mind the possibility of an ovum developing in the peritoneal cavity of an animal, not the

parent of the ovum. Dr Ballantyne had called attention to parental responsibility, and he (Dr Felkin) thought that more might be done in impressing upon parents their responsibility with regard to both the propagation of children and the necessary treatment in some cases of women during pregnancy. It was especially interesting to notice what Dr Ballantyne said with regard to the occurrence of small-pox in the vaccinated mother, and it was a question to be investigated in such cases whether the father had been vaccinated or not, as it would throw greater light upon the parental element in the cause of fœtal disease. In a paper which Dr Felkin read some time ago before this Society he had, he believed, shown that a father could transmit malaria to a fœtus, the mother remaining free from the disease. He thought much might be done in examining fœtuses born in the tropics, both on account of the frequency of splenic disease, and also of jaundice of a peculiar nature, with which the child was either born or from which it suffered two or three days after birth. There was no doubt, too, that it might be possible for much to be done in diagnosing the fœtal condition during birth, both by paying attention to its pulse, its movements, and such symptoms as are often presented in fœtal malaria. In investigating this subject, Dr Ballantyne would probably find that some information, or at any rate some light, might be thrown on it by investigating ancient writers. It was remarkable to notice how much these old authorities either knew or predicted with regard to disease. He wished to call special attention to a subject which is germane to Dr Ballantyne's paper, because, so far as he knew, no attention had been paid to the matter, and it was one of no little practical importance. Without going into the subject of the possible or probable action of a variety of drugs upon the fœtus in utero, he wished to refer to the action of one drug, namely, quinine. Authorities disagree as to the effect which quinine has, or may have, when administered to pregnant women,—some thinking that it tends to induce a miscarriage, others that it has little or no such tendency. In many text-books one finds it stated that quinine should not be given to a pregnant woman when suffering from malaria. He happened to have had considerable experience in this matter, and he had never found it, even when given in large doses, act as an oxytocic, and he therefore thought that it might be given with perfect safety in cases of malaria in pregnant women, and even its hypodermic administration in cases of pernicious malarial fever did not, he believed, exert any influence on the duration of pregnancy. If a miscarriage took place it was due, in his opinion, to the disease and not the remedy. He used, therefore, to teach that when necessary quinine might be given in large doses to pregnant women when suffering from malaria, but during the past two years he had been obliged to change his opinion, and he now taught that, if possible, large doses of quinine should be

avoided, and only administered as a *dernier ressort*. The reason for his change of view was that he was inclined to think that just as they knew that large doses of quinine might injuriously affect the nervous system of an adult, so in like manner might the free administration of quinine to a woman act deleteriously upon the nervous system of the child. They would all be aware that in rare cases the administration of large doses of quinine to an adult might produce such an effect upon the system that a permanent ringing or buzzing in the ears might ensue,—a condition difficult to cure in many cases, impossible to cure in some. The administration of hydrobromic acid might prevent this untoward result, but in his experience it failed to cure it after it had once occurred. He believed that Erb of Heidelberg had cured some cases of this nature by applying galvanism to the cranium, but in this even he was rather sceptical. He had met with two cases in which children had been affected from their earliest consciousness with this same symptom. These children had not been dosed with quinine, but both the mothers had been exceedingly ill during pregnancy, and had had very large doses of quinine administered to them. It appeared to him that this point was well worthy of attention, for he was inclined to think that a considerable amount of the nervous debility exhibited by Anglo-Indian children was to be attributed to the effect of quinine administered to their mothers previous to their birth.

Dr Ballantyne felt that he had been stimulated and encouraged to proceed with his researches on fœtal diseases by the kindly criticism which his paper had evoked. He had been much interested by what had fallen from Dr Felkin with regard to the influence of the male element in the etiology of fœtal disease, and had read his suggestive paper on fœtal malaria. The question of maternal impressions had been touched upon, and he hoped before long to lay before the Society one series of cases in which a mental shock to the mother had been alleged to be the cause of fœtal abnormality, and another series in which, although there were grave fœtal anomalies, no maternal cause was assigned or even hinted at.

IV. THE INFLUENCE OF INFLUENZA UPON WOMEN.

By Robert W. Felkin, M.D., F.R.S.E., L.R.C.P., L.R.C.S.E., etc., Lecturer on Diseases of the Tropics and Climatology, Edinburgh School of Medicine.

As, unfortunately, influenza has reappeared this winter, I am desirous of calling attention to one or two points in relation to it which, so far as I have noticed, have received scant attention, namely, its action upon pregnant women, its effect upon menstruation, and, in this connexion, the behaviour of the rash when present, and the occurrence of what I may call erratic menstruation, or at any rate uterine hæmorrhage.

Naturally I am not going to inflict upon this Society my views upon the general subject of influenza, but I think it right to mention that I consider the disease to be dengue modified by climate.

On March the 5th, 1890, Dr D. J. Brakenridge read a most valuable paper on Influenza before the Medico-Chirurgical Society, and he noted that "the tendency of the disease to attack women about the menstrual period was in many cases a very noticeable fact" (*Trans. Medico-Chir. Society*, vol. ix. p. 124). In the discussion which followed this paper, I said, referring to cases which I had seen, "in one case miscarriage had taken place, in two abortion, and in another abortion threatened" (*Ibid.* p. 140).

Before referring to the cases which I then mentioned and to others which I have since seen, let me refer briefly to one or two facts with regard to the action of dengue, to its relapses and rashes. Horton says, "After a day and a half to three or four days we may have a remission of the severe symptoms, which remission may last for two or four days, when, if the patient is not carefully treated, a second paroxysm occurs. On the sixth or seventh day from the onset of the disease a second or terminal rash appears, variable in character. It may be red, smooth, and continuous as in scarlet fever, or rough and dark as in measles. Or it may be papular, vesicular, or like urticaria or erysipelas" (see *Diseases of Tropical Climates*, Horton, 1879, 2nd edition, p. 170 *et seq.*) Moodeen Sheriffe (Madras, 1872) said, "The first rash may appear on the first, third, or fifth day, or there may be two or three rashes, each severer than the preceding. It is well also to notice that pain in the testicle may be troublesome, and an 'effusion of serous fluid in the sac of the tunica vaginalis' may take place." Dr W. J. Moore (*Manual of the Diseases of India*, 1886, 2nd edition, p. 157 *et seq.*) refers to the swelling of the testicles and the rashes, an initial and a secondary rash and frequent relapses, "persons often suffering from two to three attacks." Again, in Quain (vol. i. p. 309) and others, we find it stated that in the female uterine hæmorrhage and miscarriage may occur. Referring to others, to which I need not call especial attention, we find it often mentioned that in dengue a well-marked crisis has been noticed, indicated by pain in the groin and testicles in men, or pain in the groin and back in women (see Leblond especially).

During 1889–90, and again in 1891, I have seen considerably over 300 cases of influenza in this city, and, fortunately at any rate for my theory of influenza, I have seen a considerable number of rashes, certain abortions, miscarriages, and premature labours, which to a certain extent uphold my view of the real nature of the disease. It would take too long, and would probably be uninteresting to most of the members of this Society, were I to refer to the various epidemics of dengue which I have witnessed in Africa, but I must say that the cases of influenza which I have seen in

this country, and three attacks which I have myself experienced, are conclusive to my mind that we are dealing with one and the self-same disease, modified, however, as I have before stated, by climate.

To come, however, to my cases. The first was that of Mrs K., who was expecting in December 1889. I was called to her on November 12 at 9.30 P.M., on account of sudden hæmorrhage. She said that she had been ill for five days with influenza, for which she had been treated by someone else. On this day she had, to use her own expression, become as red as a lobster, and had lost a good quantity of blood, and having engaged me for her confinement she sent for me. The waters had broken half an hour before my arrival; she was bleeding pretty smartly; the head was low down. I therefore delivered her at once. Her recovery was protracted, owing to a secondary rash, which occurred upon the 14th of November, of a papular character, accompanied by a temperature of 103°·8 and a second attack of coryza.

Mrs MacD., expected in June 1890. I was sent for on December 4, 1889. She was then suffering from a well-marked attack of influenza; temperature was 105°; fell to 101° next day; but the day after she had another rise of temperature, 104°, accompanied by an eruption which looked very much like that of scarlet fever, and after having seen her at 3 o'clock in the afternoon, I was called back at 6, when hæmorrhage and abortion had taken place.

Mrs A., expecting in April 1890, sent for me on December 6, 1889. She had been ill for only a few hours; her temperature was then 102°, but at 11 in the evening it was 105°·2. Two days after she had a rash similar to the woman just referred to. An attack of diarrhœa occurred that day, but in the evening I was sent for and found her bleeding severely. She had, as she told me, some bearing-down pains. Thinking that she might be going to abort, I treated her with opium, and on my visit next morning I found that she likewise had a severe eruption, but that the hæmorrhage had stopped, and she was subsequently delivered at full term.

Mrs R., expecting in May 1890, sent for me on December 20, 1889, for severe bleeding. She had been suffering, as I found, from influenza for six days. She had been treated by someone else (a dispensary student), but although I did my best for her, I could not avert an abortion which took place on the 21st.

Passing now to recent cases,—Mrs W., expecting in December or January, had a severe attack of influenza at the commencement of November 1891, on the fifth day of which month, after being in bed for three days with influenza, she had a severe attack of hæmorrhage, and miscarried next day. I did not see her until after the event, but the day after she had a papular eruption covering the whole body.

Mrs S., expecting in February next year, sent for me on 26th of November. She was suffering from influenza. Temperature was 105°, but as usual it fell next day to 102°. The day after a papular eruption occurred, and the next day I was sent for hurriedly, to find that she had given birth to a premature child, and it is noteworthy in this case to mention that the child had an eruption similar to that of the mother. This occurrence I have only noticed once.

Mrs M'G., expecting in January 1892, sent for me on the 3rd of November, for severe hæmorrhage. Her temperature was 104°. She was covered by an eruption which looked very much like measles, but as she had had measles twice before, I recognised it as an influenza eruption. Notwithstanding all treatment she was delivered next day.

Mrs B., expecting in January 1892, sent for me on the 10th of November. This case was similar to the last, and I need not further refer to it.

Mrs I. sent for me on 18th of November 1890. She was suffering from influenza. It followed its normal course until the 22nd, when I found her covered with a papular eruption. She said that she was unwell, which she thought strange, as she had only concluded her previous period on the 10th, and she was usually very regular.

Mrs A. and Mrs W. both sent for me on Monday, 24th of November 1890. They both had influenza. On Wednesday, the 26th, both had an eruption, and told me that they were unwell. Mrs A. had concluded her last period on the 20th, Mrs W. on the 19th.

Mrs B. sent for me on the 15th of December, suffering from influenza. On the 19th she had a rash, and was unwell. Her previous period had ended on the 10th of that month. This case was very interesting, because two of her sons were taken ill on the 21st, and on the 26th both complained of excruciating pain in the back and testicles.

December 21st I saw Mrs W. She had had influenza for three or four days. Feeling exceedingly weak and ill on this day, she sent for me. I found her with a temperature of 104°·8, covered with a measly eruption, and unwell. Her previous period had ended on the 15th.

On January 2, 1891, I was asked to attend Miss A. P. She had had influenza for four days, and was alarmed at the recurrence of her period, which was very profuse, after only ten days' absence.

On the same day Mrs I., Mrs T., and Mrs B. all applied to me under similar circumstances, the date of the period varying slightly in each case, but never more than twelve days before my visit.

On the 5th of January I was sent for to see Miss P. She was in extreme anxiety because of an urticarial eruption, which she

attributed to some salmon patties she had eaten on New Year's Eve. She had been feeling unwell, and had been advised not to go to the party where she had them. On the 2nd of January her temperature had been 104°. Being a medical student, she attributed this to a disordered stomach; but on the 5th she sent for me, thinking she was poisoned, and that the eruption was due to it. Her temperature was then only 101°, but she complained of rheumatic pains in all her joints, a severe pain in her back and in the lower part of her abdomen, and on the 5th pretty sharp hæmorrhage occurred. She had concluded her last period on the 24th of December 1890. The period lasted for five days, and disappeared with the eruption.

Mrs M., seen also on the 5th. She had been suffering from influenza for five days. Severe hæmorrhage came on later in the day, which weakened her very much, and on the 7th she died.

I need not trouble you with many more cases of a like description, although out of one hundred women whom I have attended, no less than sixty have suffered from some menstrual irregularity, and seventy-nine from ovarian pain.

I must, however, refer to three cases which I have seen very recently.

The first was Miss M'L., whom I saw on the 22nd of November. She is 12 years and 3 months. She was taken with severe influenza on the 19th, but as her mother and governess had had it previously, they thought they would treat her. They were surprised, however, to see on the morning of the 26th that she had lost a considerable quantity of blood, and as she had previously shown no signs of puberty, they were alarmed, and sent for me. The day after the appearance of the blood the usual measly rash occurred.

I have another case of this description—Miss T. She is only 10. I saw her on the 1st of December, when she had influenza, but not very badly. On the 3rd, her mother told me, with some surprise, that she had become unwell for the first time, and that she had a curious eruption, which had been diagnosed by a student as herpes zoster. This I hardly wonder at, because, from the middle of the back, curving downwards towards the right, and following the course of a nerve, there was a well-marked chain of fifteen herpetic-looking spots. I was able to get a photograph of this case, but, unfortunately, little could be made of it, as the room in which it was taken was very dark, and it had evidently been under-exposed.

The last case I will call your attention to is that of Mrs R. Her husband had been suffering for some days from influenza. On Nov. 6th I was called in, and found her with a severe attack of influenza, and a temperature of 105°. A steady flow of blood had set in, she being about three months pregnant. The next day, the second of the hæmorrhage, a well-marked papular rash occurred.

On the 8th the hæmorrhage, which had not been very severe, stopped, and she is now convalescent.

I suppose it behoves me to add one word in conclusion to give my opinion as to the occurrence of the various abnormalities which I witnessed. I think that they can only be due to either—(*a*) high temperature, (*b*) ovarian irritation, or (*c*) reflex irritation due to the eruption. This last cause I think a very doubtful one, and consider it more likely that the second cause is the one to which most attention should be paid.

Knowing, as we undoubtedly do, that the crisis in dengue is shown by pain in the groin and testicles in men, I do not see why like irritation should not occur in females, and I should be very glad to hear the opinion of other members of this Society as to whether they have any experience either confirming or confuting my views.

Since this paper was written I have seen Miss E. I was called to see her on January 18, on which day she was attacked by influenza. She is 49, and had not been unwell for five years, but on the above date, to her great surprise, her period came on.

The President thought the Society was much indebted to Dr Felkin for his interesting and important contribution. It seemed to him (the President) that the profession was painfully at sea in regard to the real nature of this so-called epidemical influenza; and though it had been suggested on various hands that we had to do with dengue, the demonstration had not been so clear as to have led to the general adoption of this idea. He (the President) was greatly interested in hearing Dr Felkin's observations on the influence of the disease in producing a tendency to hæmorrhage. The Maternity had kept free of the epidemic, and not being in general practice he had not had opportunity of watching the effect of it on many pregnant or parturient women; but in one case of labour, which had been followed by an almost fatal post-partum hæmorrhage, he had believed that the hæmorrhage was due to influenza, of which the patient had begun to show symptoms two days before labour set in.

Dr Playfair agreed with the President that they were greatly indebted to Dr Felkin for bringing this subject before them. The point in the paper which interested him most was the influence of influenza on pregnancy and the menstrual function. He could recall at present three cases of pregnancy complicated by influenza, and in none of them had the influenza the slightest effect so far as he could see. The pregnancy was not interrupted, nor the labours modified in any way—no post-partum hæmorrhage or other complication. Regarding the effect of influenza on menstruation, he saw that day a lady who had an attack of influenza about a fortnight ago. She menstruated a few days after, and again had a discharge of blood about ten days later, which lasted about five days.

Dr Rattray said at present he had several cases of influenza under his care both among young and old. In regard to women when menstruating, marked depression or exhaustion was observed. As to the other conditions Dr Felkin had mentioned, he could not at present spot any well-marked case of abortion, etc., in connexion with influenza. At the same time he joined other Fellows in thanking Dr Felkin for his interesting communication on the influence of influenza upon women.

Dr J. W. Ballantyne had observed during the first epidemic of influenza two years ago, that in one interesting case it seemed as if the disease had led to abortion and the formation of a hæmatoma in the left broad ligament; in that case there was continuous hæmorrhage, sometimes great, at other times only to a small degree, which had lasted for twelve weeks, and could not be controlled by astringent remedies. He had at present a patient under his care who expected to be confined in a week, and she had just passed through a smart attack of influenza; he would watch carefully at the labour for any indication of excessive blood loss. The immunity from influenza of young infants was a matter which had been largely dwelt upon lately, especially by American and Continental authors, and his experience had been that in the first two epidemics sucklings were rarely affected, but this winter he had found many children and even babies suffering from the characteristic symptoms of the prevailing influenza.

MEETING III.—JANUARY 13, 1892.

Professor A. R. SIMPSON, *President, in the Chair.*

I. ON ASTHMA GRAVIDARUM, WITH AN ILLUSTRATIVE CASE.

By J. HALLIDAY CROOM, M.D., F.R.C.P. Ed., F.R.S.E., Physician to the Royal Maternity Hospital; Physician to, and Clinical Lecturer on Diseases of Women, Royal Infirmary; Lecturer on Midwifery and Diseases of Women, School of Medicine, Edinburgh.

ONE of the most able writers on bronchial asthma defines it as "a neurosis depending upon tonic spasm of the bronchial muscles, and caused by faulty innervation of the pneumogastric nerve."

The exciting causes of it may, therefore, be divided into those which act on the nerve directly, and those which are reflected from some remote part or organ.

That it is essentially a nervous disease, and due in some instances to remote reflex influences, is well illustrated by its relation to uterine affection. This is referred to in very general terms in gynæcological works.

Asthma, in those women who are the subjects of it, appears to

occur with more severity at the menstrual period. This has been shown by Hyde Salter and others to be an established fact, more especially with those forms of asthma which show a monthly periodicity. In them, if the menstrual period should occur, the symptoms are markedly increased. I have only met with two cases of asthma where this monthly periodicity was established. In one case the menstrual period was included in the periodic return only once every second month, and each time it was so the attack of asthma was correspondingly severe. In the other the patient ceased to menstruate entirely when she was thirty years of age, and her asthma completely and entirely ceased simultaneously.

Dr Waring Curran has pointed out that asthma occurs most markedly at the menstrual period in women who are the subjects of fibroid tumours. The paroxysms are then severe, and the menstruation is, of course, excessive and prolonged. In three separate cases which he observed, he found no evidence or symptom of asthma till a day or two before the catamenia commenced, and, without treatment, the asthma passed away as the patient recovered from the menstruation. The same author quotes a case of ovarian dropsy which he had tapped on five different occasions, and who always suffered from asthma at every menstrual period.

The most persistent cases of asthma originating in relation to the uterus seem, however, to be those which are connected with fibroid tumours, and, indeed, the suffering of some women in this way is particularly severe, inasmuch as the asthma is usually of that dry form without any expectoration to relieve it. One of the severest cases of asthma I ever witnessed in a woman was in a patient who suffered from a fibroid tumour, and with irregular hæmorrhages. As her uterine tumour increased, and as her hæmorrhage was profuse and her asthma of frequent occurrence, I removed her ovaries and tubes, the result being that her attacks of asthma, which previously were fortnightly in their occurrence, have now almost entirely disappeared, occurring only at long intervals when she changes from one part of the country to another.

The following cases recorded by Dr Hyde Salter are markedly illustrative of the uterine origin of asthma and of its relation to parturition:—

C. B., aged 42, married, with several children, has been troubled ever since the age of 16 with asthma, and also with sneezing to such a degree as to amount to a positive disease. Her attacks of asthma were only occasional. These symptoms came on apparently from want of development of the menstrual function; when, however, that appeared she got no better. But when she married *her asthma at once left her.* The only times at which asthma has reappeared are during labour at each of her confinements.

Mary H., a lady aged 40, has had asthma regularly for the last

three years, but for years previous to that she had it occasionally, under the following curious circumstances:—She has four children, the eldest being 15 years of age. At each confinement she has had an attack of asthma. Up to the last three years she has only had asthma under these circumstances. Her youngest child is 10 years old.

But the case which specially induced me to refer to this matter is one where asthma was induced immediately on the occurrence of pregnancy, was co-extensive with pregnancy, and ceased instantly when abortion took place.

The case was as follows:—She was a tall, anæmic, highly nervous female, æt. 25, on a visit to Edinburgh. She sent for me late one evening complaining of some cough and difficulty of breathing. She had very slight bronchial expectoration. She told me she had been suffering in the same way at intervals for a month previously. There was no indication of any pulmonary affection beyond a little bronchial breathing. Her menstruation had been suppressed for two months. To this I did not give special heed, believing that the change north and her anæmia quite accounted for it. Though anæmic, her menstruation had always been quite regular till two months ago. She had enjoyed good health previous to this illness. Her first attack of pain in her chest with difficulty of breathing came on when she expected her menstrual period—that is five weeks from the time I saw her. She had suffered on five or six occasions during the past six weeks. The attacks had come on with unfailing regularity immediately after retiring to bed about ten o'clock.

The following night I was again summoned hurriedly to see her, and found her suffering from a violent paroxysm of asthma. She was sitting up in bed, her hands grasping her knees, her shoulders were drawn up, and her face anxious and of dusky hue; her eyes were staring, her nostrils dilated, and her hair and forehead wet with perspiration. I sent for the usual remedies—De Joy's cigarettes and stramonium—but before these arrived the attack had passed off. I left very careful instructions as to diet and regimen, with a view to warding off another attack.

The succeeding afternoon the patient sent for me, complaining of pain in her pelvis. She told me that her period had returned slightly. Late in the evening of the same day I saw her in a most violent attack of asthma. It lasted quite three-quarters of an hour. Her face when I saw her was livid, her lips blue. She was sitting up in bed grasping a stool; her eyes were bloodshot. The sterno-cleido-mastoids were very firmly contracted, and stood out very distinctly. After it had passed over she complained of pelvic pain and much bleeding. I examined and found copious hæmorrhage going on from the vagina, and large clots lying in the bed. These I removed and examined, and found

an entire ovum of about two months. She made an excellent recovery, and menstruated regularly thereafter, and has never had a recurrence of the respiratory trouble. I made careful inquiry as to her symptoms. She had never had morning sickness, nor any indication of pregnancy beyond the suppression of her menses. Although I examined her chest before the abortion repeatedly, I was *not* struck by the areola; and after the abortion did actually occur, I examined the breasts, and found the pigmentation and Montgomery tubercles very slightly marked indeed. To sum up the points of interest about this case, they seem to be these:—

1. That the asthma occurred originally at the time of the first menstrual suppression. This is somewhat similar to the behaviour of morning sickness, which, though it is sometimes coincident with conception, usually does not appear till the second month. It seldom persists after the fourth. Whether the respiratory branches of the vagus would have behaved in a similar way, and the asthma disappeared after the fourth month, the issue of my case did not permit of observation. Hyde Salter, however, records a case in which asthma occurred coincidently with conception, and where the attacks occurred every month until the patient was delivered at the eighth month. This patient had no morning sickness whatever. It seems therefore clear that irritation to pulmonary branches of the vagus does not act in the same way as a similar irritation to the gastric branches.

2. The period of the day at which the paroxysm of asthma may occur is variable, yet it seems most usual after midnight, and nineteen out of twenty cases occur between two and three in the morning. In its occurrence immediately after retiring to bed, it more resembled a case of cardiac asthma. This, of course, naturally suggests the question, May this not have been a case of cardiac asthma?

I think not, in so far at least as the asthma was due to any lesion of that organ. She was examined by others as well as myself, and no trace of organic disease could be discovered; not only so, though to all appearance she was anæmic, yet there were no murmurs of any kind to be heard over the cardiac area. Besides which, cardiac dyspnœa is always aggravated by exertion; and again, even when the paroxysm has passed off there is always more or less embarrassment in cardiac cases, where there is none in asthma. And here it may just as well be mentioned that the other conditions, such as spasm or œdema of the glottis, are not likely to be mistaken for this, because Biermer has pointed out an important symptom by which all these affections can be distinguished from asthma, viz., "Dyspnœa during *expiration* is just as characteristic of narrowing of the finer bronchi as the same condition during *inspiration* is of croup and other forms of laryngeal stenosis."

Spasm of the diaphragm is the only condition for which this patient could have been mistaken. I have not, to my knowledge, seen a case of this affection, but the following description of it seems to me to render any such mistake impossible:—

"This rare disease, which is almost always associated with hysteria, is characterized by a short inspiratory movement, during which all the muscles of inspiration are brought into action, and we have the same sinking in of the more yielding portions of the thorax which has just been mentioned as one of the distinguishing features of laryngeal stenosis. After this the thorax remains fixed for a few seconds, the muscles of inspiration remaining in a state of contraction. There then ensues a quick and powerful expiratory effort, accompanied by a sound not unlike that of a hiccough; then another inspiration, with a repetition of the above symptom; and so on until the attack is over. It will be seen from this description that this affection resembles singultus more than asthma, and that there is but little likelihood of its being mistaken for the latter disease."

I have mentioned these sources of error, because the case I have just recorded is so rare that I think it well so far as possible to eliminate all possibility of mistake.

The third point of interest is that the pulmonary branches of the vagus seemed to be entirely affected, to the absolute exclusion of the gastric branches, for there was no sickness throughout. Indeed, it seemed as if the pulmonary branches were affected instead of the gastric; indeed, as if the asthma had taken the place of the ordinary sickness. The patient was just the woman in whom one would expect the reflex symptoms of pregnancy to be most marked. She was a highly nervous woman, who had become pregnant under distressing circumstances; but although reflex symptoms were quite to be expected, yet it is difficult to explain why the vagus in its pulmonary branches should be affected more than the usual gastric branches, more especially as the patient never had any pulmonary or cardiac affection, nor had any hereditary tendency thereto.

4. The abortion was no doubt due to the violence of the attack. It is a fact that during expiration the abdominal muscles are firm and tense, especially the recti, and the pressure exerted is often sufficient to empty the bowel and bladder. The pressure and extra determination of the blood of the attack of the previous night were sufficient to separate the ovum, as was shown by the pain and hæmorrhage the following day. The increased violence of the last attack, due no doubt to the activity of the uterus, ended on the entire expulsion of the ovum.

BIERMER, "Ueber Bronchial Asthma," *Sammlung Klinischerverträge*, No. 12.

"Zur Kentness des Bronchial Asthmas," Virchow's *Archiv*, Band 54, 1870.

Asthma, its Pathology and Treatment, by Hyde Salter, 1868.
WARING CURRAN, *ibid.*

The President was very much interested in Dr Croom's communication, and thought the Society were indebted to him for the careful record of a very rare case and the observations he had made in connexion with it. The subject of asthma in connexion with menstrual disturbances was not unknown. For instance, in Sir James Simpson's Clinical Lectures asthma uterinum was discussed in relation to amenorrhœa. But such cases were not of frequent occurrence, and careful records of such cases as Dr Croom's were a valuable addition to our knowledge of the subject. Dr Croom had apparently adopted the idea that the relation between the asthma and the pregnancy was to be found in connexion with the nervous system, and he (the President) did not question the correctness of Dr Croom's explanation in this, or indeed in other cases. The sympathetic relation between the uterus and the lungs and stomach had led Dr Oliver to suggest that the sexual centre in the nervous system was to be found high up in the medulla, close to the respiratory centre and root of the pneumo-gastric nerve. But it was not to be lost sight of that there subsisted another relation between the uterus and the lungs in the condition of the blood, for it had been shown that the amount of carbonic gas exhaled from the lungs in women became increased in all cases of suppression of menstruation. This occurred not only in cases of pathological amenorrhœa, but in the physiological amenorrhœa of pregnancy as well; and the increased activity called for in the lungs during amenorrhœa might have something to do with the occurrence of asthma in such cases.

Dr Berry Hart congratulated Dr Halliday Croom on his able clinical paper. The cases of tumour associated with pregnancy in double uteri were extremely rare, and the account all the more valuable. He himself had seen about six cases of fibroid complicating pregnancy; but all the tumours were high up, and gave little special trouble.

II. ON THE ALLEGED GROWTH OF THE PLACENTA IN EXTRA-UTERINE GESTATION AFTER THE DEATH OF THE FŒTUS.

By Dr BERRY HART, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Midwifery and Diseases of Women, Surgeons' Hall; Physician, Royal Maternity and Simpson Memorial Hospital; Assistant Gynæcological Physician, Royal Infirmary, Edinburgh; Examiner in Midwifery, University of Edinburgh.

WITHIN recent years the statement has been confidently made by several eminent gynæcologists that the placenta in extra-uterine gestation may grow after the fœtus has died. Up till

recently I was of the same opinion, but fresh consideration of this belief in the light of new material has seriously shaken me in it, and I therefore wish to reopen this question.

Mr Lawson Tait (1) [1] says, "As I am responsible for having made a statement that I had seen the placenta growing after the fœtus had clearly been dead for some time, let me here draw the attention of Dr Buckmaster and others to the evidence upon which the statement is based. In Case No. VI. the rupture had occurred apparently in the tenth or eleventh week of a gestation, and the placenta was lying in the midst of a quantity of clots as a round mass the size of a cricket ball, for the most part in the wall of the tube, for when the tumour was removed the placenta was still adherent to part of its inner surface and the pelvic mass was intact. On slitting it open the ovum cavity was found to contain about a dessert-spoonful of liquor amnii, but there was no trace of fœtus at all.

"As we have very frequent experience of this kind of incident —the growth of a huge placenta, embracing a small ovum cavity without any, or with only a slight trace of a fœtus in the so-called uterine 'moles'—we have no reason to do other than expect that it will occasionally occur in tubal pregnancy. As a matter of fact such was the state of matters in this case.

"In Case XIX., when the fœtus was found it was only about two and one-half inches long, and had evidently been dead for some considerable time, for it was partly digested, whereas the placenta had grown to be quite as large as that of an intra-uterine fœtation of four months, and it had been forming adhesions to intestine and omentum, giving rise to recurrent hæmorrhages, for which the operation had ultimately to be performed.

"Similar appearances occurred also in Cases XXIV., XXX., XXXII., and XXXVII. . . . .

"In looking over the records of cases which have gone beyond the full period of gestation, I find numerous illustrations which cannot be other than the growth of the placenta after the death of the child. No emphasis in any case is laid upon this fact, but the descriptions completely establish it. In a case mentioned by the first Mr Samuel Hey, of Leeds, the patient went over the nine months with a false labour, and the child died. Three months after the mother succumbed from the sufferings involved in the carriage of the ectopic gestation. The child was found to be fully developed and showed no marks of decomposition. As the child had attained a size so unusual as to weigh nearly two pounds and a half, the cyst was supposed to be the right Fallopian tube, but the description makes it perfectly clear that it was the right broad ligament together with the tube. The placenta in this case must have grown greatly after the death of the child."

[1] The figures within parentheses refer to bibliography at the end of the article.

The following opinions were given at a discussion in the London Obstetrical Society in 1887:—

"Another point in which Mr Tait was greatly interested was that indicated by Mr Knowsley Thornton when he gave evidence to the effect that the placenta grew after the death of the fœtus. When evidence on this point was first brought forward, it was one of the observations to which he (Mr Tait) had listened with great hesitation, and he had several times written to this effect, for he could not believe it. But there could be no question now that it was so, that after the fœtus died the placenta went on growing in at least a fairly large number of these cases."

In the same debate Dr G. E. Herman (2) said, "There were two kinds of placenta met with in extra-uterine gestation: one kind was thin and spread out, having very extensive attachments, and this kind would evidently be very difficult of complete removal, and much more difficult at term than at the fourth month, as in the case related by Mr Tait. There were other cases in which the placenta formed a thick, solid lump, thicker than a normal placenta, and closer in texture, looking not unlike a piece of hepatised lung. In this kind the vascular connexion between the placenta and the maternal structures was much less extensive, and the placenta could be removed without great difficulty.

"He had exhibited to the Society at its meeting on June 2nd, 1886, an extra-uterine fœtus and placenta which he had successfully removed. In that case the placenta was of this kind, and its removal is easy. The placenta now shown of Dr Champney's case presented the same characters, and he gathered from the paper that it was so loose that it might have been easily removed.

"Mr Knowsley Thornton (3) had exhibited to the Society a fœtus and placenta which he had removed with success, and the condition of this placenta was similar.

"So was the one exhibited this evening by Mr Doran, and there was another in the museum of the Royal College of Surgeons which was like those already mentioned. Judging from the cases at present known to him, he thought this transformation of the placenta into a fleshy mass easy of removal took place after the death of the fœtus. It would help greatly in treatment if we knew upon what these differences in the placenta depended, and could diagnose the condition of the placenta before operation."

Mr Knowsley Thornton (3), in a case which he believed to be tubal (the tumour reached nearly to the umbilicus), stated that "the fœtus would appear to have died about the beginning of the fourth month, while the placenta continued to grow, and hence at the time of operation presented that peculiar solid mass which simulated a solid ovarian or uterine tumour."

Freeland Barbour (4), in describing a frozen section of an extra-uterine gestation which had advanced to the middle of the fifth month, speaks of death having been caused by hæmorrhage

from "the continued growth of the placenta after the fœtus had died."

In his recent most valuable work on the *Surgical Diseases of the Ovaries and Fallopian Tubes*, Mr Bland Sutton (5) expresses himself guardedly, saying, "In the majority of cases the fœtus dies. When this event occurs at the fourth or fifth month there is reason to believe that the placenta may, in some instances, continue to grow, instead of undergoing atrophy."

It is evident from these quotations that, among several observers well qualified to judge, it is held that the placenta undeniably large as compared with that of normal pregnancy, found in cases of extra-uterine gestation where the fœtus has died, is due to a growth of the placenta continuing after the death.

Yet for this statement there seems to me no adequate proof.

Before one could make such a deduction it must be shown:

1. That the placenta in cases where the fœtus is alive is distinctly smaller than in those where for some time previous to examination the fœtus has died.

2. The part that so grows should be demonstrated microscopically by an examination of such cases as are indicated under 1.

This proof, however, has not been given, and it may simplify this part of the paper if I say that, so far as I have read, no proof has ever been brought forward.

It is an undoubted fact that the extra-uterine placenta is, to the naked eye, markedly different from the normal one. If we take the placenta as displayed in the more recent literature, we find that on section it is a dense, liver-like substance, resembling closely a blood clot hardened in spirit. So unlike normal placenta is it that one's first thought on looking at it is that it is some solid tumour.

I have personally examined, post mortem, four cases of extra-uterine gestation in regard to the question of this alleged growth of the placenta after the death of the fœtus. One of these was a broad-ligament gestation, the others were advanced abdominal gestations. All were examined by means of frozen sections, and microscopical examination of the placenta was also made. These cases are now to be considered so far as they bear on our present inquiry.

I. Broad-ligament Gestation.—This was a pregnancy which had developed between the layers of the broad ligament, and was about the fourth and a half month. The fœtus lay below in the sac, while the placenta was at the roof of the sac. This specimen is figured in the original paper (6) by Dr Carter and myself, and copied in Tait's *Ectopic Gestation* and Bland Sutton's *Surgical Diseases of the Ovaries and Fallopian Tubes*. The fœtus was quite fresh and not macerated, and seemed less advanced than one would have expected.

The placenta formed a firm mass attached to the extra-peritoneal surface of the top of the broad ligament, and measured two and

three-quarter inches (vert.) by two inches (breadth) by three inches (antero-posteriorly).

On microscopical examination it is found to be made up of villi which in structure and arrangement differ considerably from the normal (Fig. 5). They are disposed very irregularly, and are not nearly so numerous as in an ordinary placenta. The individual villi are compressed, so that the connective tissue of which they are formed is much denser than usual and the nuclei crowded very closely together. Only here and there are vessels to be found in the villi. A covering of a single layer of flattened epithelium can usually be traced round them, but sometimes this seems to have disappeared. These villi are embedded, not in blood spaces as in the normal placenta, but in connective tissue of

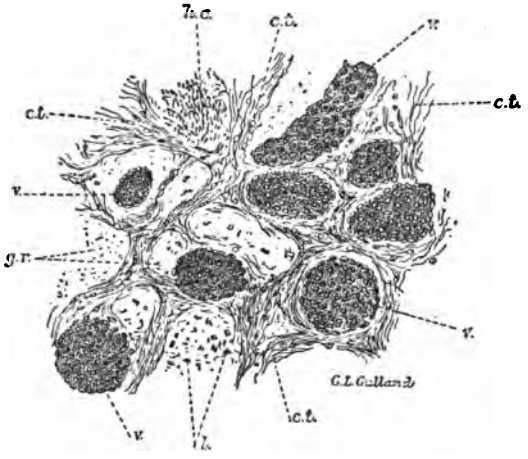


FIG. 1.—Placenta of extra-uterine gestation at 4½ months. × 200. *v*, villus; *c t*, connective tissue; *h c*, hematoidin crystals; *l*, leucocytes; *g r*, granular debris.

the ordinary areolar variety, in which are a certain number of fat cells, and which is here and there traversed by bands of unstriped muscular fibres. This connective tissue is sometimes compressed in the neighbourhood of the villi, and in the same situation its meshes are often full of leucocytes. The bloodvessels of this connective tissue are fairly numerous, but stand in no very traceable relation to the villi. But the most striking feature in the sections is the enormous number of hematoidin crystals scattered through them. These are evidently the result of old blood extravasations, and these have apparently occurred at different dates, to judge from their disposition. There are brown masses, as large as peas, here and there in the preparations, entirely made up of crystals, large and small, whilst all through the connective tissue, but especially close to the villi, are smaller foci in which

the crystals are usually small. All trace of red blood-corpuscles has disappeared from these masses, but many leucocytes are to be found in the smaller ones and at the margins of the larger masses, where also there is a certain amount of newly formed connective tissue. These extravasations have often displaced the connective tissue considerably from around the villi, and compressed villi are here and there to be seen in the midst of the larger masses of crystals[1] (Fig. 1).

II. CASE OF ADVANCED EXTRA-PERITONEAL GESTATION (6).—Here the woman was supposed to have gone beyond the time of

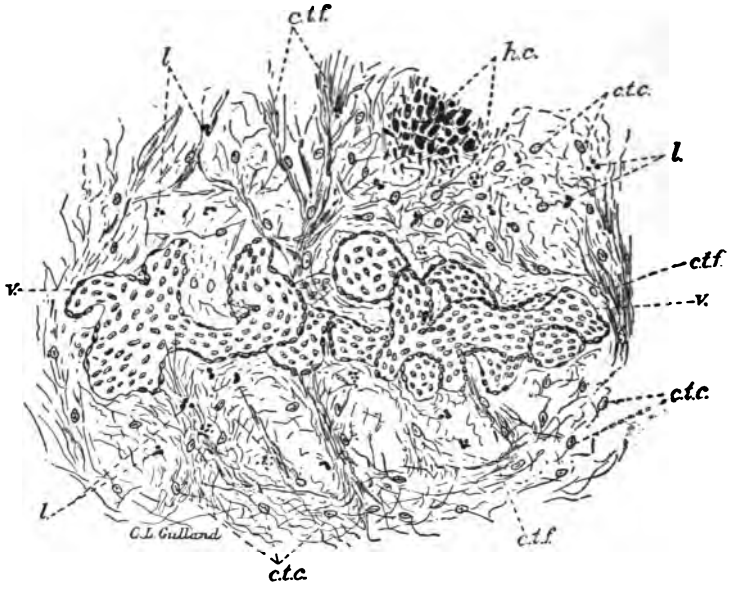


FIG. 2.—Placenta of extra-uterine gestation at full term. × 250. *v.* villus; *h c*, hematoidin crystals; *c t c*, connective tissue corpuscles: *c t f*, connective-tissue fibres; *l*, leucocytes.

normal pregnancy. The fœtus had begun to decompose, but was fairly well nourished and not macerated. It weighed two pounds four ounces.

The placenta was attached to the anterior abdominal wall and inner surface of the peritoneum as follows: It measured five and two-fifth inches vertically, three and one-fourth inches from side to side, and three and one-fourth inches antero-posteriorly (thirteen and one-half by eight by eight centimetres), *i.e.*, was somewhat cocoanut-shaped. To the naked eye and touch it had a firm, spirit-hardened, liver-like aspect. On microscopical examination it was found practically to be connective tissue, with large areas

[1] The description of the microscopical conditions is that of my assistant, Dr Lovell Gulland, who is an expert in this matter.

of extravasated blood crystals and tortuous, distorted villi, with more or less degenerated epithelium. More particularly it may be described as follows:—In this case the placenta is formed almost entirely of the fœtal villi and blood clot more or less organized; the maternal connective tissue takes little or no part in its structure. The villi are greatly altered, and are much more compressed than those in Case I., the alteration in them consisting rather in an extreme tortuosity and distortion of the villus as a whole than in any very marked pathological change in its individual elements. The villus stems are generally isolated, and often widely separated from one another. They are embedded in connective tissue of a very low type, apparently the result of organization of blood clot, as numerous masses of hematoidin crystals are found scattered through it. Some of the crystals are very large, others very small; but they are not so numerous as a whole as in Case I., and the organisation of the extravasations has gone on to greater perfection. Many capillaries are to be found in the more fully organized parts of the intervillous tissue, few in the less perfectly organized areas. Leucocytes are numerous, but they have not the same marked relation to the villi as in Case I., nor are the capillaries arranged with any relation to the villi (Fig. 2).

III. ABDOMINAL GESTATION: FŒTUS AT FULL TIME IN PERITONEAL CAVITY, WITH PLACENTA LYING BENEATH PELVIC PERITONEUM AND IN PART ABOVE BLADDER.—This specimen has not been specially described before. Abdominal section was performed by Prof. Simpson, and a dead fœtus extracted. On post-mortem the pelvis was removed by Dr Freeland Barbour, to whose great kindness I owe the specimen.

The points of interest in the clinical history are as follows:—Last menstruation, beginning of July, 1886; severe vomiting in September, with bloody discharge and apparent abortion (evidently a decidua); then a great deal of pain, persisting for weeks, beginning usually at 10 P.M. and lasting till 4 or 5 A.M.; in beginning of April fœtal movements ceased, pain passed off, and abdomen diminished in size.

On physical examination a tumour is felt reaching from pelvis and right iliac fossa up to below left ribs; vertical measurement, eight inches. Head of fœtus can be felt between examining hands immediately below ribs on left side. The fœtal limbs lie to front and right, and are felt distinctly. No bruit or fœtal heart. On vaginal examination os uteri admits tip of finger; rest of examination unsatisfactory, but a round, elastic swelling is felt through roof of vagina (placenta).[1]

This patient unfortunately vacillated between medical attendants, and was seen at various periods by at least three specialists. Symptoms of peritonitis and obstruction of the bowels came on

[1] Report by Dr J. Hutchison, Dr Keiller's resident physician, Royal Maternity Hospital.

after dilatation of the cervix with tents, and on May 22nd, Prof. Simpson performed laparotomy and extracted the child, now dead, from the amniotic cavity lying intraperitoneally. The cord was found separated about two inches from the navel. The placenta,

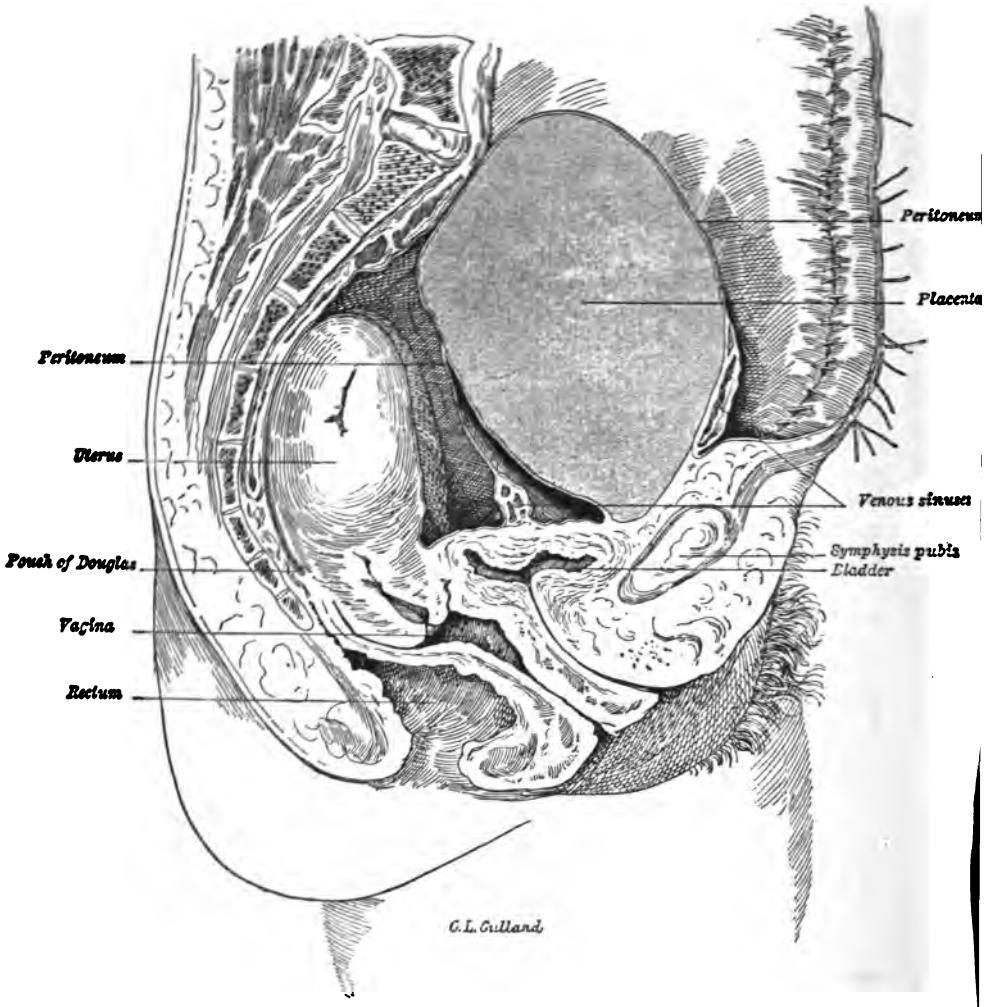


FIG. 3.—Sagittal mesial section of pelvis showing extra-peritoneal placenta (½).

which lay below, was not touched. Patient died at 10 A.M. on May 24th, 1887. The child weighed five pounds, measured twenty inches; skin peeling and bones of head soft. It was fully developed, and had no external malformation except right talipes varus.

When the pelvis was removed it was frozen and sawn (Fig. 3) in sagittal mesial section.

The uterus (which measures three and one-half inches in length) lies retroposed, and the placenta is extra-peritoneal, placed beneath the pelvic peritoneum and in the middle line, above the bladder. It is a rounded mass, measuring four inches in all its diameters. It has the ordinary liver-like aspect, and is firm to the touch. Large veins are seen lying at its anterior and posterior edges (Fig. 3).

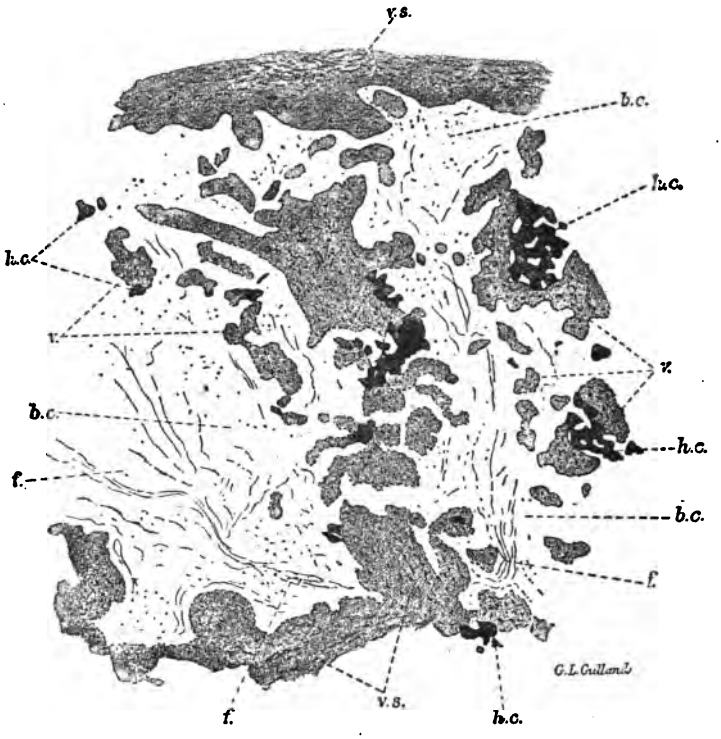


FIG. 4.—Placenta of extra-uterine gestation at full term. × 50. *v s*, villus stem; *v*, villus; *b c*, blood clot; *h c*, hæmatoidin crystals; *f*, fibrin strands.

The placenta here, on microscopical examination, presents a much more nearly normal appearance than in either of the foregoing cases. In some places the villi are as closely packed together as in the normal placenta, and they are in most situations identical in appearance with normal villi, but here and there they are widely separated from one another. In this placenta also blood extravasation has occurred; the villi are embedded, not in connective tissue, but in blood clot. In this the outlines of the red blood corpuscles are still recognisable in places, though there

are many fibrin threads running through it, and in some places, especially round some of the villi, dense layers have been deposited. There are many hæmatoidin crystals also, all of large size, and found almost exclusively near the villi. There is little or no maternal connective tissue except near the margin of the placenta, and in the specimens examined the blood clot had nowhere as yet become organized (Fig. 4).

IV. CASE OF FULL-TIME INTRA-PERITONEAL EXTRA-UTERINE PREGNANCY; PLACENTA IN TUBE, FŒTUS AND AMNIOTIC SAC IN PERITONEAL CAVITY; LAPAROTOMY BY DR HALLIDAY CROOM, AND DEAD CHILD EXTRACTED; MOTHER DIED.—This case will shortly be published *in extenso* by Dr J. C. Webster, who has in the meantime kindly given me the following abstract of his work:—

"Chief facts regarding nature of placental sac, placenta, and membranes in full-time 'tubo-peritoneal ectopic gestation:'—

"1. Increase in size of Fallopian tube accompanying the growth of placenta, due to increase in connective tissue and muscle, chiefly in former.

"2. The proportion of these two elements to each other is the reverse of what is found in the normal tube, the connective tissue now being greatly in excess.

"3. The connective tissue is more compact for most part, and the fibres in many places larger than in normal tube.

"4. The normal arrangement of the muscle in two layers is completely altered, the fibres being found in groups, which run in various directions.

"5. There is enormous enlargement of vessels opposite placental site, and the large sinuses are found chiefly in deep layers of the wall.

"6. Trabeculæ containing vessels extend into placenta from the wall.

"7. The epithelium normally lining tube no longer exists, no glandular layer like that found in uterine pregnancy being seen.

"8. No decidual cells are found anywhere in placental sac wall.

"9. Placenta, at time of operation in its sac, was a discoid mass in left side of pelvis, extending above brim for about three inches.

"10. After death (thirty-eight hours after operation) the shape became changed owing to blood extravasation into its substance, so that it was found as an irregular rounded mass, the greater portion of the placenta being destroyed.

"11. Sections of unaltered placental tissue resemble closely those of normal placenta in uterine pregnancy.

"12. Villi are seen attached to sac wall.

"13. Trabecular bands of various sizes pass from sac wall into placental substance.

"14. In several places the placental structure is much altered by old hæmorrhages, the villi being compressed and having lost their covering epithelium, in some cases having a sort of hyaline

degeneration, but in most cases having become very fibrous, their vessels being obliterated and indicated by lines of blood crystals. Blood clots are seen in various stages of degeneration.

"15. The amniotic covering resembles that seen in an ordinary placenta.

"16. The chorionic layer under the amnion is of dense fibrous tissue, from which villous stems project.

"17. Secondary (peritoneal) sac which contained the fœtus is lined throughout with amnion, which in many places is considerably wrinkled.

"It consists of a layer of cubical epithelial cells resting on a thin layer of connective tissue, which is attached to fibrous layer—altered and thickened peritoneal covering of the various structures to which it was attached."

I have now to consider what explanation is to be given of the undeniably altered conditions of the placenta, especially in the first three cases, to which the present remarks apply.

The ordinary belief is that the placenta has grown after the death of the fœtus.

Now, no statement has been made as to what part of the placenta grows. It cannot be the fœtal portion, as the fœtus is alleged to be dead, and there is no special maternal portion in advanced cases except the ordinary connective tissue, and no reason why this should grow when the active villi are dead. The increase in bulk of the placenta is brought about by organized blood clot, and we see no reason why the death of the fœtus should cause this blood effusion. The apparent reason for this belief seems to be that the alleged primary extra-uterine gestation, where the villi were supposed to graft themselves on the peritoneum and where the placenta was necessarily stationary, seemed to call for this alleged growth of placental tissue after the death of the fœtus as the only explanation of the unusual placental bulk. The primary grafting of villi on the free surface of the peritoneum is, however, a myth, and so with its discredit the dependent myth of the placental growth after fœtal death must disappear.

I believe that the increased bulk of the placenta is produced only during the life of the fœtus and not after its death.

In none of the four cases I record can one trace any special relation between the bulk of the placenta and fœtal death. In Cases II. and III. the fœtuses were well developed and near full time, and in Case I. the fœtus was evidently not long dead. The real explanation of the increased size and altered structure is much more probably as follows:—We now know that there is no primary peritoneal pregnancy, *i.e.*, no case known where the placenta has had the free peritoneal surface as its maternal portion. Advanced abdominal gestation has arisen primarily from a Fallopian-tube pregnancy where the placenta remains in the extra-peritoneal tissue, or, more rarely, in the tube. The fœtus may be

also extra-peritoneal, or by secondary rupture may lie, with or without its amnion, in the peritoneal cavity.

In this extra-peritoneal development of the placenta we have two things happening which do not occur in normal pregnancy. The extra-peritoneal placenta—(1), develops below a serous membrane, which it separates from the subjacent tissues; (2), it is displaced usually either down and not extensively if the growing fœtus lies above it, or up and extensively if the fœtus lies below. *It is this extra-peritoneal burrowing and displacement that causes the blood effusion and connective-tissue formation leading to the larger bulk of placenta, and it can only happen during active fœtal life. The alterations in the structure of the placenta, when extensive, cause the death of the fœtus, and in proportion as these are less profound are the children healthy* (7). (Fig. 5.)

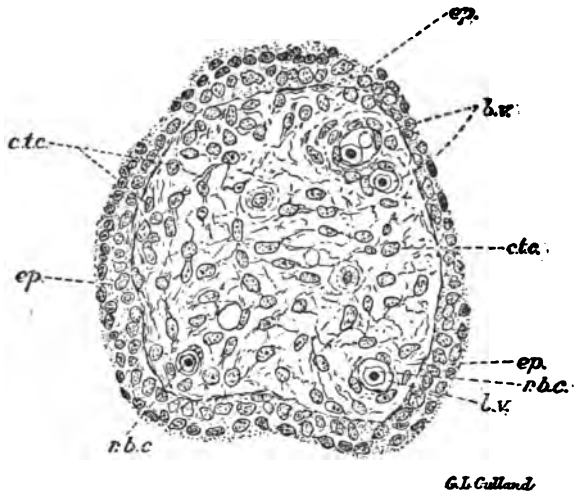


FIG. 5.—Transverse section of villus from placenta of a normal six weeks' pregnancy. × 400. *e p*, double epithelial layer; *c t c*, connective-tissue corpuscles; *b v*, bloodvessels; *r b c*, red blood corpuscle.

In the last case (Webster's, No. IV.) the placenta developed in the tube, was not subject to displacement as in the first three, and thus had no great alteration in the structure of its fœtal portion. Unfortunately its size could not be accurately estimated, owing to blood extravasation, the result of operation.

LITERATURE.

1. LAWSON TAIT.—*Diseases of Women*, vol. i., Richardson & Co., Leicester, 1889 (*vide* also "Ectopic Gestation"); *London Obstetrical Transactions*, xxix., page 504.

2. G. ERNEST HERMAN.—*London Obstetrical Transactions*, xxix. page 506.
3. J. K. THORNTON.—*London Obstetrical Transactions*, page 85. See also *British Gynæcological Journal*, vol. iv. page 37.
4. HART and BARBOUR.—*Manual of Gynæcology*, first edition, page 271. Barbour does not speak of this growth in his original paper, *Edinburgh Medical and Edinburgh Obstetrical Transactions*, 1882.
5. J. BLAND SUTTON.—*Surgical Diseases of the Ovaries and Fallopian Tubes.* Cassell & Co., London, 1891.
6. HART and CARTER.—*Edinburgh Medical Journal*, Oct. 1887.
7. D. BERRY HART.—"Displacement of the Placenta in Extra-uterine Gestation and its relation to those Cases ending in Pelvic Abscess," *Edinburgh Medical Journal*, October 1889 and 1891.

The President thought the communication of Dr Hart was of great value in throwing light into a somewhat obscure region of pathology. Dr Hart had already helped to clear up our ideas on some points in connexion with extra-uterine gestation, and these fresh observations would bring us still nearer a complete knowledge of the subject. He (the President) would like to know whether Dr Hart had made any observation as to the relative extent of chorionic area that goes to form placenta in intra- and extra-uterine ova respectively. In the uterus the chorion finds itself in contact with a thick vascular mucosa in which it can find within a limited area sufficient space for placental development. In the Fallopian tube, on the other hand, the mucosa is so thin that the chorion would require to become ingrafted into it over a much more extended surface before the fœtal and maternal blood-vessels could come into sufficient contact to allow of the development of the fœtus. Such wide extent of the placental area would explain the apparently large size of the placenta in cases of extra-uterine pregnancy, the bulk of it being increased in thickness when the sac contracted, and the extravasation and other changes taking place in it which Dr Hart had so well described. This, as Dr Hart had shown, would render unnecessary the conception that any growth of the placenta took place after death of the fœtus. Dr Hart had denied the possibility of any attachment of the placenta to peritoneal surface; but he (the President) was under the impression that in a communication made to this Society some years ago, Prof. Freund had demonstrated this occurrence, and showed that the peritoneal surface underwent a previous preparatory change.

Dr Croom had listened to Dr Hart's paper with great pleasure, and he thought that the author had, in the main, sustained his position. *A priori* he thought that reasoning by analogy, after the death of the fœtus, the placenta being no longer of use, it would

naturally, instead of increasing, tend to diminish, but as a matter of fact, in two cases of early extra-uterine pregnancy upon which Dr Croom had operated, the preparation had been given to Dr Haultain for investigation, and he had found conditions somewhat similar to those which Dr Hart had so ably described. He thought Dr Hart's was a perfectly tenable position, and believed that he had proved his point.

Dr Berry Hart thanked the Fellows for their kind reception of his paper. Dr Simpson thought that the ovum in Fallopian-tube gestation might form all round the tube, and thus be large. This, however, was not the case; and he might say that his own belief at present was, that grafting of the villi took place on connective tissue and not on epithelium. On this point, however, he was preparing, along with Dr Gulland, a special paper.

3. CASES ILLUSTRATIVE OF OPERATIVE INTERFERENCE WITH FIBROID TUMOURS DURING PREGNANCY, LABOUR, AND PUERPERIUM.

By J. Halliday Croom, M.D., F.R.C.P. Ed., Physician to the Royal Maternity Hospital; Physician to, and Clinical Lecturer on Diseases of Women, Royal Infirmary; Lecturer on Midwifery and Diseases of Women, School of Medicine, Edinburgh.

I.—*During Pregnancy—Myomectomy.*

Case.	Name.	Medical Attendant.	Nature of Case.	Period of Pregnancy.	Result of Operation.	
1.	H. D.	Dr Croom.	Subperitoneal pediculated fibroid.	4 months.	Recovery.	Delivered at term.
2.	L. C.	Dr Hunter.	Subperitoneal fibroid.	3 months.	Death.	...
3.	M. F.	Waiting-room	Subperitoneal pediculated fibroid with ovarian cystoma.	5 months.	Recovery.	Delivery at term.

II.—*After Abortion—Hysterectomy.*

1.	S. H.	Dr Trotter.	Large fibro-cystic tumour of uterus.	...	Recovery.	...
2.	B. H.	Dr Cameron.	Large fibro-cystic tumour of uterus.	...	Recovery.	...

III.—*During Labour—Removal per Vaginam.*

1.	C. F.	Dr Sinclair.	Pediculated fibroid obstructing delivery.	...	Recovery.	...

IV.—*During Puerperium.*

1.	E. R.	Dr Kirk.	Submucous fibroid.	Removal.	Death.	...
2.	H. C.	Dr Playfair.	Submucous fibroid.	Removal.	Recovery.	...
3.	L. M.	Dr Sidey.	Submucous fibroid.	Removal.	Recovery.	...

It is but seldom—notwithstanding their great frequency among child-bearing women—that fibroid tumours give rise to any inconvenience during pregnancy, and still less frequently do they require any surgical interference.

The ordinary history of such tumours in the non-pregnant

condition is well known, and even in exceptional circumstances, when they are a source of danger to the patient, the method of dealing with them by removal of the ovaries, and in some cases by the continuous current, has rendered their entire removal a comparatively infrequent operation. The behaviour of fibroid and similar tumours during pregnancy is interesting. In over 400 cases of abdominal section I have only had to interfere with ovarian tumours four times during pregnancy, and with fibroids the cases which I now record are all that have come under my notice. The growth of these tumours is often rapid during pregnancy, resulting in interference with the circulation and œdema of the lower extremities. They are a frequent cause of abortion and profuse uterine hæmorrhage, and often by their bulk cause interference with the functions of bladder and rectum. They often alter the position of the uterus, and as a result abnormal presentations of the fœtus and prolapse of the cord are by no means infrequent. Furthermore and specially, abnormality in the uterine contractions is a frequent complication of labour, and the expulsion of the fœtus is often unduly prolonged. As in the case about to be recorded, the presence of a myoma which obstructs labour is similar to a contracted pelvis. Rupture of the uterus in cases of large myomata has been observed, and one case of the kind I have myself recorded. Hæmorrhage during the placental period is often so profuse as to endanger the patient's life, and fibroid tumours of the uterus form one of the most common causes of secondary post-partum hæmorrhage. With regard to the puerperal period, septic infection and abnormal involution are by no means uncommon.

Susserott collected from all sources a series of 147 cases of labour complicated with fibroid tumour; 60 per cent. of these labours were terminated instrumentally.

CASE I.—A woman of 35 years of age was admitted to my ward. She had been married five years, and was sterile. She specially sought advice because of much pain in her left side, associated with irregular hæmorrhages. She had not missed a period. For a year past her menstruation had been increasing in quantity and frequency. Her hæmorrhages were less a source of distress to her than the pain in the left side, associated with a hardness and swelling in that region. The swelling and pain had been the subject of observation for over three months.

On examination per vaginam a large semi-solid swelling was felt on the left side, filling up the fornix, and bimanually it was found projecting over the brim of the pelvis. It was tense, about the size of a cocoa-nut, and its superior surface was irregular. A tumour of smaller size, obviously the uterus, was felt to the right side and behind. It was considerably enlarged. The cervix was thick, soft, and slightly patulous. (There was a well-marked souffle all over the pelvic brim.)

Though the continued hæmorrhage was rather against it, the softness of the uterus pointed to pregnancy, and the right side tumour seemed a dermoid ovarian, which had taken on rapid growth.

A more careful examination per rectum under chloroform permitted the detection of a firm pedicle, about as thick as two fingers, passing from the left cornu of the uterus. The conclusion arrived at was that the tumour was a rapidly growing myoma, associated with an early pregnancy. It was clear that the pregnancy—if it were one—could not continue with a tumour of such dimensions, and in that situation, and in any case, the rapid growth of the tumour and the pain demanded interference. Even if it had been justifiable to interfere with the ovaries, which in the case of a pregnant uterus was inadmissible, any attempt at their removal would have been more hazardous than the removal of the fibroid itself owing to their inaccessible position.

The abdomen was accordingly opened, and the tumour exposed. It proved a soft uterine myoma. There was no difficulty in dealing with it by double knot, and at the same time sewing up very carefully the rest of the pedicle and dropping it back. There was enlargement of the uterus corresponding to a two and a half months' pregnancy.

The case gave no further trouble. The hæmorrhages—which were no doubt due to the rapid growth of the myoma causing congestion of the decidua and hæmorrhage from the lower pole of the uterus, as well as attempts at abortion—ceased, and the patient was delivered at seven months.

CASE II.—The patient, aged 35, had been married for years, and was sterile. She was sent to me because of great pain in the left side. Her menstruation, which had been previously irregular and profuse, had been suppressed for two months. There was a distinct tumour to be felt over the brim of the pelvis in the left side. It was tender on pressure per vaginam; the tumour could be felt, tender and soft, occupying the entire left fornix. The uterus was enlarged and thrown to the right side. There were no auscultatory sounds. There seemed to be no communication between the uterus and the tumour. The case was diagnosed as a small ovarian tumour, with some peritonitis over it, and pregnancy. On opening the abdomen, the tumour was found to be a large, rapidly growing, soft fibroid attached to the left side of the uterus by a thin pedicle. This was dealt with in the usual way. The operation offered no difficulty whatever. Immediately afterwards, however, the patient succumbed to old-standing aortic disease. No autopsy was permitted.

CASE III.—Was sent to my ward as a case of pregnancy complicated with an ovarian tumour. There was no difficulty whatever in

diagnosing the ovarian tumour on the right side and the uterus on the left. The only point was that the fundus uteri was more than usually prominent. The pregnancy had advanced five months. The ovarian tumour was removed without difficulty. The cause, however, of the prominence of the uterus became evident, because there was found behind the uterus a fibroid myoma, with a pedicle about the thickness of two fingers—the myoma itself being about the size of a cocoa-nut, very vascular and soft. After removing the ovarian tumour, I also removed the myoma in the usual way by piercing the pedicle and putting a double knot over it, stitching the end of the stump up, and dropping it back into the abdominal cavity. The patient made an excellent recovery, and was delivered at term.

The following two cases were sent to me during the continuance of the pregnancy, and as both present features of interest, I now desire to record them.

CASE I.—Mrs H. had been married for eighteen months and was pregnant of her first child. The pregnancy was sufficiently obvious. It had advanced to about the seventh month, and occupied the left side of the abdomen. On the right side there was a large semi-solid tumour reaching up to the liver and displacing the uterus very much towards the left side. The tumour was painless and had grown coincidently almost with the pregnancy. The patient had observed a slight swelling over her pelvis before her marriage, but this was trifling, and it was only after she became pregnant that her abdomen increased with enormous rapidity. The growth of the tumour and the uterus went on almost *pari passu*. From the rapid growth of the tumour, its position, and physical examination, I came to the conclusion it was a polycystic ovarian tumour. The obvious question then arose, whether to induce premature labour or remove the tumour. I decided upon the latter. Labour, however, set in, and she was delivered of a seven month child, which did not survive. The labour was normal, but immediately afterwards she had a very considerable peritonitis, and the tumour continued to grow with marked rapidity. Owing to the continuance of the peritonitis and the rapid growth of the tumour, I determined to operate within six weeks after delivery. I opened the abdomen and found extensive and recent peritonitis, and instead of having to deal with an ovarian tumour as I had expected, I found a large fibro-cystic tumour; the still enlarged and recently pregnant empty horn of a bicornuous uterus could now be easily made out. The sound showed a single cervix and a double uterine cavity. The left-side cavity, which had contained the fœtus, was still about four and a half inches long; and the right, from which the tumour projected by a pedicle, was a little larger. The two were distinctly separated by a sulcus, and were connected apparently through the cervix uteri only. The tumour was

exposed, and first ligatured by the elastic ligature, and afterwards grasped by the Koeberle clamp and the delta wire. The peritoneum was adjusted round the stump, and the patient made a good recovery.

CASE II. was sent to me by Dr Cameron of Innerleithen, who in his note with the case said that the patient had a large tumour and was pregnant. On examination I found her a young woman of thirty, married for one year, with a large solid tumour reaching up to her ensiform cartilage. There was neither uterine souffle nor fœtal heart to be heard anywhere. Per vaginam, the cervix, though large, was firm and hard, and as her menstruation had been regular, I was disposed to think that my friend Dr Cameron's diagnosis was wrong. I passed the sound into the uterus and found it of its normal size. I wrote to Dr Cameron, and told him that I was obliged to disagree with him. I was disposed to think that the patient suffered from a large semi-solid ovarian tumour. Nothing in the case led me to suppose that the tumour was anything else. I had all the preparations made for the operation, and a week after my first examination, and the day before the operation, the patient aborted of a four months' fœtus. I need scarcely say that I was surprised, and at the same time rather crestfallen in my diagnosis. The tumour remained after the abortion pretty much as it was before. Three weeks afterwards I opened the patient's abdomen and found that the tumour was a large fibro-cystic tumour of the uterus, almost a counterpart of the previous one, with diffuse peritonitis. After securing the stump of the tumour with the elastic ligature and the delta wire and Koeberle clamp, I examined the pelvis, and found on the right side an ovarian tumour about the size of an ordinary cocoa-nut. This I also removed, and on examining further into the pelvis, I found that the uterus, as in the preceding case, was bicornuous; that while the left horn had contained a four months' ovum, the right horn into which I had introduced the sound was empty and small. The patient made an excellent recovery. She passed, two days after the operation, a complete decidua, apparently from the empty horn. This is specially interesting, as the operation was performed three weeks after the abortion.

These two cases seem to me of importance, first, because of the rarity of a bicornuous uterus. In both cases the left horn was pregnant and the right horn empty. In both cases the tumour was fibro-cystic and growing from the empty horn.

Both were large, the peritonitis recent, the adhesions numerous, and the operation long and tedious. The uterus, further, in both cases had not by any means completely involuted.

The following case illustrates well dystocia from impaction due to a pedunculated myoma.

I saw the case with the late Dr Sinclair. He had been called by a midwife to a woman, a multipara, who had been in labour for ten hours, and who had made no progress, and was in addition bleeding profusely.

Dr Sinclair found the patient in violent labour, and on examination found a large mass, firm and hard, blocking up the vagina, there being only a space of about half an inch between the tumour and the vaginal wall, through which the fingers could be passed with difficulty. Together we examined the patient. The head could not be reached per vaginam, but could be palpated through the abdomen, apparently of ordinary dimensions. Under deep anæsthesia it was possible to get the fingers beyond the tumour and feel a thick hard pedicle, and round it the rim of the cervix. The head was *not* lying on the tumour, but evidently pressing hard on the neck of the pedicle. It was just possible to touch the head.

Obviously removal of the obstructing mass was the only course to be pursued. We endeavoured to get the ecraseur round the base as far as possible. In this we only partially succeeded, for the tumour was so tense and so completely filled the vagina that we had to be content to grasp the greater portion, and, as was to be expected after cutting so large a surface, the hæmorrhage was very profuse. To stop the bleeding we put on forceps and pulled down the head. After delivery the hæmorrhage continued severe. We found the pedicle, which was long and thick, attached within the cervix. There was nothing for it but to grasp the bleeding stump with forceps, and to pass a needle through it and throw a double knot over it. This entirely stopped the hæmorrhage. The tumour was of course much larger in the vagina than after its removal, and was of the nature of a fibrous polypus of unusually large size. Both mother and child did well.

This is the only time I have met with a similar dystocia during labour. I have had twice to deal with ovarian cystomata as an obstruction. In both cases aspiratory needle and subsequent delivery with forceps were successful both as regards mother and child.

There was very considerable rise of temperature and pulse, and for some fourteen days the patient was distinctly septic, and during that time careful antiseptic intra-uterine douching was carried out. Without this the patient would probably have been lost. Three weeks afterwards Dr Sinclair and I examined her, and curiously enough we found the Tait knot projecting from the cervix.

Lastly, I have to record three cases where fibrous polypi of considerable size, causing profuse hæmorrhage, were removed within three or four days after labour. Two of these I have already recorded in a paper to this Society some years ago. The last is as follows:—

M. S., a multipara of 40 years of age, was delivered after a

rapid labour of a full-term male child. She made an excellent recovery for two or three days. On the fourth day she had a profuse hæmorrhage. This continued with such severity that in his emergency Dr Sidey sent for me, being in the immediate neighbourhood. My hand being thoroughly antiseptic, I introduced it through the partially closed cervix, and found a polypoidal mass lying just within the os. After a little trouble and with the aid of an ecraseur the mass was removed. It turned out to be a well-marked fibrous polypus. Careful antiseptic washing was kept up for ten days. The patient made an excellent recovery.

This case along with the two previously recorded present characteristic examples of a rare complication of the puerperium. Judging by the records of the cases recorded, and to which reference has been made in a previous paper, many of these polypi are extruded spontaneously. The presence of such growths during the puerperium is not without grave danger. Sometimes they soften, break down, and decompose, and are the cause of peritonitis, and become the seat of gangrenous degeneration. This is chiefly the case in the submucous fibroid projecting into the cavity of the puerperal uterus similar to those which I have just recorded.

Similar cases are related by Senderling, Yeld, Kiwisch, Wynn Williams, and Duncan. Wynn Williams relates a case where a large submucous fibroid, which obstructed labour, was enucleated and removed in his efforts to break up the child. Weber relates a case in which turning had been had recourse to, and where a tumour as large as a man's fist was removed with the placenta.

As the practical deduction from these we may formulate the rule, that when the tumour is easily accessible, and can be removed without a severe operation in the first few days of the puerperium, such artificial removal ought to be had recourse to in order to prevent the possibility of gangrene and septic absorption. Care must be taken that the whole tumour be removed, in case of the base sloughing and giving rise to septicæmia, as in my first case. If there be any doubt as to the possibility of its entire removal, it had better be left alone, and allow Nature to expel it spontaneously. If, however, the removal involve a severe operation it would obviously be prudent not to interfere. Of course in those cases where the tumour gives rise to septicæmia late in the puerperium, its immediate removal is a matter of necessity. In all cases of removal of these growths in the puerperium, too much stress cannot be laid on the extreme importance of washing out the cavity of the uterus with corrosive daily, until every trace of fœtor has disappeared. In both my cases pieces of slough and very fœtid discharge continued for many days after the removal, and in spite of careful washing out one ultimately succumbed.

Dr Berry Hart remarked on the rarity of the cases, and the care with which they had been recorded.

4. A SERIES OF THIRTEEN CASES OF ALLEGED MATERNAL IMPRESSION.

By J. W. BALLANTYNE, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Diseases of Infancy and Childhood, Minto House, and on Midwifery and Gynæcology, Medical College for Women, Edinburgh; Secretary to the Edinburgh Obstetrical Society.

DURING last winter I ventured to lay before this Society the records of some cases in which a maternal impression was the alleged cause of a fœtal defect or malformation, and I endeavoured to point out what seemed to me to be the rational way of studying this subject. I believed then, and I believe now, that we are not concerned at present with the questions, How are maternal impressions effective? or, How can their action be physiologically and reasonably explained? but rather with the preliminary inquiry whether, in conjunction with certain definite circumstances, certain clearly marked phenomena occur so frequently and so persistently as to compel the belief that there is more than the element of chance or coincidence in their association. Do fœtal anomalies follow maternal impressions so frequently as to warrant the statement that they stand in the relationship of effect and cause? It would have been futile to have spent time in discussing the possible explanations of the phenomenon of atavism in heredity before it was proven that this curious method of the transmission of diseases or peculiarities really existed; but now that atavism is an accepted fact, biologists and physiologists are rightly busying themselves with the inquiry into its meaning and causes. When it has been demonstrated that maternal impressions occur so frequently as the forerunners of fœtal bodily or mental defects as to warrant the assertion that the former are potent in producing the latter, then, and only then, it will be wise to adduce theories to explain such a relationship.

In the above-mentioned paper it was also pointed out that each alleged case of maternal impression must be most carefully scrutinized, and that in every instance certain facts must be ascertained. Seven questions were stated which were considered as of vital importance. These were—(1.) What was the age of the pregnancy when the impression occurred? (2.) What was the character of the impression? (3.) Was the object causing the impression similar to the defect produced? (4.) What was the channel or channels through which the impression was received? (5.) Was the mother conscious of the impression, and did she anticipate a defect in her child? (6.) What was the duration and strength of the impression? and (7.) Was there any evidence that the defect might have been hereditary?

Since the publication of my paper (*Edinburgh Medical Journal*, January 1891), I have received from medical friends records of cases observed by them in which all the above-named questions

were thoroughly investigated. To these observers I now tender my thanks for the time and care which they have expended upon the inquiries they have made for me.

I shall narrate the cases in the order in which they were received, and shall thereafter give a summary of the results obtained from their study.

CASE I.—Mrs M., a patient under the care of Dr Arthur Wilson, gave the following account of the circumstances which she believes led to the production of a peculiar mark on her child's chest. In October 1883, when she was 20 years of age, and had borne one healthy child, she was at work in the hold of a vessel, and during the meal-hour a fellow-worker threw an apple at her, which struck her on the left side between the waist and the breast. At the time when this happened she believed herself to be about one month pregnant, as she had seen nothing during October, and had always been regular previously, save during her first pregnancy. Subsequent events showed that her calculation was correct. At the time when she received the blow she did not experience any feeling of fear, anger, or horror; the circumstance did not impress her much at all, and she did not anticipate that any harm would result to the child. On July 2nd, 1884, she gave birth to a full-time male child, on whose chest there was a peculiar mark, similar in size to the apple which was thrown at the patient, but rather paler in colour. She then remembered the above-mentioned circumstance, and connected the impression and the mark together as cause and effect. Dr Wilson has described the mark as an oval patch 2½ inches long and 2 inches broad, situated above and to the inner side of the left nipple, which is included in its lower and outer margin, and of a bluish-brown mottled appearance, slightly darker in colour at the circumference than at the centre. Over the patch coursed several dilated veins lying immediately below the skin. It was not a nævus in the usual acceptation of the term, but rather a hyperæmic patch with a blush which disappeared on pressure, leaving a general mottling. The mother is now 28 years of age, and has borne four children, one girl and three boys, all of whom, save the boy above mentioned, who was her second child, are free from any mark or bodily defect. The boy is now 7 years old, and the mark on his chest has not increased or decreased in size, although from the relatively small size of the chest at the time of birth it then appeared larger. There is no other mark on his body. Such were the statements which Dr Wilson elicited at his first interview; but on a second occasion, when he carefully cross-examined the woman, he found that in certain points she contradicted herself,—for instance, at the first interview she said the apple hit her on the left side, but at the second she affirmed that it was on the right side. There was no history of such marks being hereditary in the woman's ante-

cedents, but there was a curious fact in her own history, which will be mentioned immediately.

I do not consider that this case affords strong evidence in support of the potency of a maternal impression; but it is interesting as an example of perhaps the commonest variety of such histories.

CASE II.—The same patient, Mrs M., exhibited in her own person an abnormality which had been ascribed by her mother to a maternal impression which she (the mother) had received when pregnant. The anomaly consisted in the presence of a patch of gray hair on the left temple, which had existed ever since the first growth of hair took place. Her mother said that when pregnant she was one day in company with her husband and her sister. The husband said he would give his wife's sister a penny for every gray hair she pulled out of his head; she pulled out several and threw them at her sister, hitting her (she thinks) on the head. The infant born soon afterwards developed the gray patch which is mentioned above, and which still exists.

The above case is not of much value for the purpose we have in view, for it has not been verified and scrutinized; but I have narrated it to show that in this family maternal impressions were evidently believed in, and that anything suggesting such a circumstance would not be likely to be overlooked.

CASE III.—It is to Dr W. Iverach Robertson that I am indebted for the history of the third case of supposed maternal impression now to be narrated. His patient was pregnant for the seventh time, and had arrived at the second month of gestation when she was very much impressed by a circumstance told her by a friend. This friend said that a child had been born in her house about whose sex there was some doubt. So far as Dr Robertson can make out, it was a case of absence of the penis. The patient had never heard of such a thing before; she was much impressed by the "strangeness" of the story, and "wondered" if such a condition had ever been heard of previously. She told Dr Robertson that she had heard of other wonderful things, but that they had not kept so much in her mind as this; for several nights she could not get to sleep through thinking about it. She most distinctly states that she did not anticipate any defect in her own child. She never saw the deformed infant, and therefore received the impression entirely through hearing of the circumstance. She was delivered at the full time of an infant, the subject of ectopia vesicæ and epispadias. All her previous children, six in number, had been healthy, and had not been deformed in any way, and there was no family history of extroversion of the bladder or of any other malformation. It is impossible in this case to say whether or not the object causing the impression closely resembled the defect produced; but there must have been some similarity

between the two conditions, for epispadias at first sight certainly suggests absence of the penis.

CASE IV.—Dr Robertson has also sent me the notes of a case which occurred in his father's (Dr W. B. Robertson's) practice, and in which he attributed the idiocy of the child to a mental shock which the mother received during her pregnancy. The patient, 33 years of age, a pluripara, went down to the country when she was about four or five months pregnant, and not feeling well went to a doctor, who listened to her heart, and told her that the cause of her trouble was heart disease. This statement frightened her very much, and she returned home at once and saw Dr Robertson, who told her that he had known the condition of her heart for several years, but had not informed her, because he did not believe it would shorten her days, and because he did not wish to frighten her. She had a mitral systolic bruit. She was so much alarmed and frightened that Dr Robertson took her to a noted London physician, who tried to comfort her in the same way that her own doctor had done. Her child (a female) was born at the full term, but as it grew up it became evident that it was imbecile. The child was, when five years old, placed in a home for such cases, and the medical man there asked whether the mother had had any great shock when four or five months pregnant. There was no family history of insanity, and the mother had had several children before this, and has had two since, all without any mental defect. The labour, it may also be said, was easy; no instruments were used, and there was no undue pressure upon the head.

CASE V.—Dr Felkin has kindly supplied me with the clinical notes of this and of several other interesting cases. The patient, Mrs A., was 22 years of age, and had arrived at the seventh month of her first pregnancy, when one evening on which she was alone in the house a beggar came to the door and was importunate and abusive. The patient tried to close the door, and managed to get the chain on, but in doing so slipt and fell. The beggar caught hold of her right ankle and pulled her with considerable force partly through the doorway, spraining her ankle so badly that she was unable to walk for three weeks afterwards. After a normal labour at the full time a child was born whose right foot was deformed (talipes varus). The mother did not anticipate any defect, and has since (four years afterwards) given birth to a perfectly normal child. Club-foot was not hereditary either on the maternal or paternal side in this case.

CASE VI.—The younger sister of the above-named patient, Mrs B., was 21 years of age, and had arrived at the seventh month of her first pregnancy when the following incident occurred:—One evening when she was in evening dress, her husband, whilst opening a soda-water bottle, allowed the cork to escape him, and

it struck his wife violently on the left arm, on the flexor aspect just below the elbow. The incident gave her a great shock, and a mark was caused on the arm, there being a slight wound due to the tin plate on the top of the cork. She was much impressed by the circumstance, and she on several occasions said to her husband in a half-jocular fashion that she wondered if her child would suffer as her sister's had done. Her infant, a male, was born at the full time, after a lingering labour in which the head presented, and upon his left arm was a well-marked circular scar, slightly vascular and depressed, which still exists. There was no prolapse of the arm during the labour. The patient has had three children since, all perfectly normal. She and her sister were both highly nervous and impressionable, and a third sister was very hysterical.

CASE VII.—Mrs H. was 27 years of age when she was delivered of her first child by means of forceps (Oct. 16th, 1881). As soon as the infant (a boy) was born, the mother asked if it was all right. The medical man, thinking she referred to its life, said, Yes; but she persistently asked if the child was all right. As soon as leisure permitted the infant was carefully examined, and it was then discovered that there was a curious mark upon his chest, which covered the whole of the right and part of the left mammary region. The skin within this area was strikingly white, rigid, and slightly puckered. When the child was shown to the mother, she exposed her own chest, and it was seen that she had lost the whole of the right breast and the lower half of the left. She explained that when 18 years of age she had received a severe burn on the chest, which had left the parts in the condition seen. She further declared that she had always expected and feared that her child would be deformed in the same way, for a friend had given birth to a child with a deformed hand after witnessing during her pregnancy an accident in which a man's hand had been badly crushed. Mrs H.'s child was otherwise perfectly healthy and normal. This case is interesting, for the patient had, during her pregnancy, the firm belief that her infant would be deformed, although the accident to herself had taken place nine years previously.

CASE VIII.—E. G., a ii. para, 28 years of age, was confined on 11th August 1881 of a female infant. The labour was a lingering one on account of faulty uterine action and a rigid os uteri, and during the confinement the patient was exceedingly anxious to know whether or not the child was alive. She had not felt any movements for two or three weeks, and about a month previous to her confinement she had seen a drowned man fished out of a canal. The child presented by the breech, and when born it was found to be dead, completely black in appearance, and with the

skin peeling off in many places. The membranes had not ruptured before labour set in. Dr Felkin tells me that it was quite different in appearance from an ordinary macerated dead fœtus.

CASE IX.—E. R., a primipara of 17½ years of age, was delivered on 5th January 1878 of an apparently normal male child. At the time of the birth the mother was very anxious to know whether the child could see, because her husband was and always had been blind, and she had confidently expected her child to be born blind. At the time of the birth it was not possible to say whether the child was blind, but soon afterwards such was found to be the case, and he has remained blind up to the present time. The child was otherwise normal. The only anomaly in the labour was the presence of a rigid perineum.

CASE X.—E. L., a primipara of 19 years of age, was on 4th May 1876 confined of a male infant. The labour was normal. The patient asked anxiously if there was anything the matter with the child's right leg. There was. A reddish scar was visible under the right knee. The mother then stated that six weeks before the birth of this child she had been bitten on the right leg by a dog. As the animal was supposed to be mad the bite had been cauterized, had then suppurated, and had only been healed for about ten days. In addition to having the wound cauterized, she had undergone a course of faith-healing in order to prevent the occurrence of hydrophobia, and to save the child from suffering. This may have intensified the impression which the accident made.

CASE XI.—Last July Dr Wm. Paterson put into my hands for dissection a specimen of marked exomphalos and anencephalus. The mother, a primipara, 21 years of age, had when about three months pregnant witnessed a child narrowly escape being run over in the street. Her impression was that the child had been run over and greatly wounded and crushed. During the remaining months of her pregnancy she was in a very nervous and hysterical state. The malformed fœtus was born between the seventh and eighth months of gestation, and there was an enormous excess of liquor amnii. The father of the infant was a tall, well-built, and healthy-looking fellow. The family history of the mother was good; no evidence of any previous abnormality (hare-lip, spina bifida, etc.) could be elicited even on very close questioning. The same result was arrived at when the paternal family history was inquired into.

CASE XII.—This case and that which follows (No. XIII.) are illustrative of a group of circumstances which are more readily accepted by the scientific mind than are any of the above-recorded clinical histories.

M. A. A., a iv. para of 22 years of age, was when seven months pregnant confined of a dead female fœtus (November 26, 1876). It was a breech presentation, and when first seen by Dr Felkin one foot was in the vagina. The mother had expected that it would be born dead, and gave as her reason the fact that she had been frightened at a fire which had occurred in her house a fortnight before. She had had some difficulty in escaping from the top flat of the house. The child did not die in the labour, but had evidently been dead for some days.

CASE XIII.—S. I., a i. para of 26 years of age, when a little over five months pregnant had attended a friend in her confinement. The friend died of post-partum hæmorrhage, and three weeks afterwards (*i.e.*, when six months pregnant) S. I. was delivered of a fœtus (February 20, 1877). She had had a considerable hæmorrhage on two occasions before labour set in, and there was after the delivery of the fœtus hour-glass contraction of the uterus, and the placenta, which was retained, had to be peeled off. She had been much alarmed at her friend's confinement, but had not anticipated any danger in her own labour.

In none of the cases save No. IX. was there any evidence forthcoming in favour of the hereditary nature of the defects. The accompanying table expresses in a condensed form the chief points in the preceding thirteen cases. Cases XII. and XIII. differ from the others in the circumstance that there was no defect or peculiarity in the fœtus, and they therefore do not come under the category of cases usually described as maternal impressions. I have, however, included them in the list, as the one is an example of death of the fœtus in utero, due, in all probability, to a great physical and mental shock, and as the other is a curious instance of the association of similar obstetric experiences in two women, of whom the latter was present at the confinement of the former.

Leaving these two cases out of account, we may now look at the results of the analysis of the eleven instances in which defect in the child followed a recorded maternal impression. The age of the mother at the time when the impression occurred varied from 17½ years to 33; and seven women out of the eleven were primiparous; there were two ii. para, one vii. para, and one "pluripara." With regard to the sex of the infant, in eight cases it was a male, and in three a female. The age of the pregnancy when the impression occurred varied much: in one case it was during the first month, in one during the second, in one during the third, in one between the fourth and fifth, in two during the seventh, in two during the eighth, and in two the impression may be said to have existed throughout the whole course of gestation. As a rule, the earlier in pregnancy the impression occurred the more serious and deep-seated the fœtal defect, but Case I. formed an exception to this rule.

No.	Age of Patient.	Number of Pregnancy.	Sex of Infant.	Character of Impression.	Age of Pregnancy.	Was Defect Similar to Impression?	Channel or Channels through which received.	Was there Consciousness of Impression?	Was Defect anticipated?	What was Length and Strength of Impression?	Was there any Suspicion of Heredity?
1	20 years	2nd	Male.	Physical.	1st month.	Yes.	Touch.	No.	No.	Transient and slight.	No.
2	—	1st	Female.	Physical.	—	Yes.	Sight.	No.	No.	Transient and slight.	No.
3	33 „	7th	Male.	Mental (wonder).	2nd month.	Yes.	Hearing.	Yes.	No.	Protracted and well marked.	No.
4	34 „	Pluripara.	Female.	Mental (fear, anxiety).	4-5 month.	Somewhat, the impression was mental, so was defect.	Hearing.	Yes.	No.	Protracted and well marked.	No.
5	22 „	1st	Male.	Physical and mental (fear).	7th month.	Yes.	Touch and sight.	Yes.	No.	Lasted three weeks, well marked.	No.
6	21 „	1st	Male.	Physical and mental (fear).	7th month.	Yes.	Touch and sight.	Yes.	Yes.	Protracted and fairly well marked.	No.
7	27 „	1st	Male.	Physical and mental (fear).	Whole period.	Yes.	Sight.	Yes.	Yes.	Protracted and well marked.	No.
8	28 „	2nd	Female.	Mental (fear).	8th month.	Yes.	Sight.	Yes.	Yes.	Short, but well marked.	No.
9	17½ „	1st	Male.	Mental (fear).	Whole period.	Yes.	Sight.	Yes.	Yes.	Prolonged and well marked.	Yes.
10	19 „	1st	Male.	Physical and mental (fear).	8th month.	Yes.	Touch and sight.	Yes.	Yes.	Lasted six weeks, well marked.	No.
11	21 „	1st	Male.	Mental (fear).	3rd month.	Similar to idea produced by impressions.	Sight.	Yes.	No.	Prolonged and strong.	No.
12	22 „	4th	—	Mental (terror).	6th month.	No.	Probably all the sensory channels.	Yes.	Yes.	Short, but well marked.	—
13	26 „	1st	—	Mental (alarm).	5th month.	Yes.	Sight.	Yes.	No.	Short and fairly well marked.	—

In two cases out of the eleven the impression seems to have been purely physical, and in three it was purely mental; in the remaining six cases it was both mental and physical. The mental impression was in most cases one of fear, or terror, or anxiety; but in one instance it was a feeling of wonder. In all the cases save two the defect was strikingly similar to the object alleged to have been its cause. In one of the exceptional cases the mother was during her pregnancy in an almost melancholic condition, and the infant born was an idiot; and in the other instance (Case XI.) the defect was similar to the appearance which the woman feared had been produced by the accident she had witnessed. The two chief channels through which the impression was conveyed seem to have been touch and sight, but in two cases it was through hearing. There was consciousness of the impression in all the cases save the first two. In five cases a defect in the child was anticipated and feared by the mother, and in six it was not. In two cases the impression was transient and slight, in six it was prolonged and well-marked, and in three it was of comparatively short duration, but was strongly marked. In the two cases in which it was slight and transient the defect also was of a slight character; but in those in which it was strong and prolonged the fœtal condition was found to be a well-marked one.

My correspondents inquired carefully into the question of heredity, but in only one out of the ten cases was there any evidence suggesting that the defect had been transmitted in this way (Case IX.) It is of great importance that the possibility of the hereditary nature of the fœtal defect be closely investigated in every case of alleged maternal impression. I have read over carefully more than thirty cases which have been recorded in various medical journals during the last twelve months, and in only one or two of them have I found any indication that the subject of heredity was inquired into at all. The absence of information upon this matter is a grave defect in the clinical history of a case of supposed maternal impression.

I must now record the cases of fœtal defect which have come under my notice during the last year in which the history of a maternal influence was looked for and not found. I have during the year met with five cases of grave fœtal anomaly, of which I was able to obtain complete clinical notes, and in none of them was there the faintest indication that a maternal impression was the cause. In a sixth case (No. 11) already recorded, the history of an impression was found.

CASE I.—A premature, still-born male child was handed over to me for dissection by Dr T. B. Darling about twelve months ago. It was a markedly malformed infant, for the penis and anus were both imperforate, the testicles had not descended into the scrotum, and there was double club-hand and club-foot. Dr Darling kindly

undertook to interrogate the mother concerning any possible cause which might serve to account for the deformities. There was absolutely no suspicion of any such cause.

CASE II.—In the case of an anencephalic fœtus which I received from Dr Menzies, there was also no history of any shock, fright, or other maternal cause during pregnancy which could be looked upon as the cause of a possible impression.

CASE III.—In August Dr Ballantyne of Dalkeith sent me a greatly deformed fœtus. It showed a marked condition of anencephalus and exomphalos, along with other defects. The history of the patient during pregnancy was carefully inquired into and no trace of a maternal impression found.

CASE IV.—In the early part of the year Dr Darling kindly asked me to see with him a new-born infant which exhibited a so-called intra-uterine amputation of the right hand. In this case also no evidence of an impression was forthcoming.

CASE V.—Dr Freeland of Broxburn recently gave me, for purposes of dissection, a fœtus the subject of general dropsy. The clinical history of the mother, although interesting in many ways, gave no suggestion of the influence of any maternal impression.

Such have been the results of a year's investigation of this subject; and whilst it is clear that in some cases the occurrences seem to be altogether too curiously suggestive to be regarded simply as coincidences, yet it is also evident that the close inquiry into all the circumstances of the alleged impression often elicits weak points in the chain of reasoning which connects together the defect and impression as effect and cause. The subject must still be regarded as *sub judice*.

5. REPORT OF THE ROYAL MATERNITY AND SIMPSON MEMORIAL HOSPITAL, FOR THE QUARTER ENDING 30TH APRIL 1891.

By G. BALFOUR MARSHALL, M.B., C.M., and E. H. ALEXANDER, M.B., C.M., Resident Surgeons.

INTERN CASES.

DURING the quarter 70 women were delivered in the Hospital. Twenty of these patients were married; 41 were i.-paræ, 16 ii.-paræ, 3 iii.-paræ, 2 iv.-paræ, 2 v.-paræ, 2 vi.-paræ, 1 vii.-para, 2 ix.-paræ, and 1 xi.-para.

Age.—(*a.*) Primiparæ—youngest, 16 years; oldest, 34 years; average age, 22·9 years. (*b.*) Multiparæ—youngest, 22 years; oldest, 42 years; average, 29·5 years.

Duration of Labour (average).—(*a.*) Primiparæ—1st stage, 13 h. 25 m.; 2nd stage, 2 h. 5 m.; 3rd stage, 24 min.; whole labour, 15 h. 54 m. (*b.*) Multiparæ—1st stage, 9 h. 49 m.; 2nd stage, 1 h. 30 m.; 3rd stage, 27 min.; whole labour, 11 h. 46 min.

Presentations and Positions.—(*a.*) Primiparæ—Longitudinal, vertex, L.O.A., 31; R.O.A., 5; R.O.P., 4. (*b.*) Multiparæ—Longitudinal: (1.) Vertex, L.O.A., 18; R.O.A., 4; R.O.P., 2; L.O.P., 1. (2.) Face—L.M.A., 1. (3.) Breech—Right coxa-cotyloid dorso-anterior (L.S.A.), 1; left coxa-cotyloid dorso-posterior (L.S.P.), 1.

Sex of Child.—(*a.*) Primiparæ—18 males, 23 females. (*b.*) Multiparæ—13 males, 14 females.

Weight of Child (at full term).—(*a.*) Primiparæ: (1.) Males—Heaviest, 10 lbs. 8 oz.; lightest, 5 lbs. 8 oz.; average, 7 lbs. 10 oz. (2.) Females—Heaviest, 9 lbs.; lightest, 4 lbs. 6 oz.; average, 6 lbs. 14 oz. (*b.*) Multiparæ: (1.) Males—Heaviest, 9 lbs. 8 oz.; lightest, 6 lbs.; average, 7 lbs. 13 oz. (2.) Females—Heaviest, 9 lbs.; lightest, 5 lbs. 3 oz.; average, 7 lbs. 3 oz.

Length of Child (at full term).—(1.) Males: Longest, 22 in.; shortest, 18 in.; average, 19·95 in. (2.) Females: Longest, 22 in.; shortest, 17 in.; average, 19·49 in.

Placenta (Weight of).—(1.) Males: Heaviest, 2 lbs.; lightest, 1 lb.; average, 1 lb. 6½ oz. (2.) Females: Heaviest, 2 lbs. 3 oz.; lightest, 13 oz.; average, 1 lb. 5 oz.

Length of Cord.—(1.) Males: Longest, 30 in.; shortest, 18 in.; average, 23·7 in. (2.) Females: Longest, 26 in.; shortest, 13 in.; average, 21·5 in.

Peculiarities of Children.—In one case there was an ovoid dimple over the sacrum, surrounded at the sides and below with soft downy hairs. In this case the sutures and fontanelles were abnormally wide. In another case marked exophthalmos. In another case the abdomen was greatly distended, delaying labour.

Peculiarities in Mothers.—In two cases (both in hospital at the same time) the patients had two nipples on the left mamma, the abnormal one being situated in the lower quadrant. In both cases the supplementary nipples were functional, and milk could easily be withdrawn through them.

Classification of Labours.—Natural, 46; laborious, 5; præternatural, 2; complex, 14; abortions, 2; retroflexion of gravid uterus, 1: total, 64.

Natural Labours.—In two cases large quantity liquor amnii. In one case hydramnios and fatty placenta. One case premature at seventh month (putrid fœtus).

Instrumental Cases.—In eight cases the axis-traction forceps were used, and in one case craniotomy.

Indications for use of Forceps.—1, Delay at outlet from prolapsed hand; 2, threatened inertia in second stage; 3, complete inertia in second stage; 4, justo-minor pelvis; 5, rigidity in old primipara; 6, strongly ossified large head; 7, exhaustion in albu-

minuria and large child; 8, case complicated with cardiac Bright's disease.

Præternatural Labours.—Breech presentations in two cases, one occurring in a case of twins. In one case a face presentation, there being a large, well-marked "caput succedaneum" over the left cheek and orbit.

Complex Cases.—(1.) Cardiac disease, Bright's disease (chronic), and goitre in a patient who made a good recovery.

(2.) Eclampsia. Child alive; recovery of mother.

(3.) Two cases accidental hæmorrhage.

(4.) Induced premature labour at eighth month for generally contracted pelvis; child dead.

(5.) Chronic bronchitis, emphysema, and right-sided dilatation of heart.

(6.) Complete inertia and entirely adherent placenta.

(7.) Placenta adherent in upper half.

(8.) Craniotomy for generally contracted and flat pelvis.

(9.) Twins; one child died on 5th day, being small and weakly.

(10.) Lateral and marginal placenta prævia. In the latter case bi-polar version performed and a leg brought down.

(11.) Prolapsus funis. Patient came in with this condition, and child was dead.

(12.) Albuminuria and great exhaustion. See special report.

Abortions.—Two cases. Both were incomplete between third and fourth month, the secundines requiring to be artificially removed.

Retroflexion of Gravid Uterus at Fourth Month.—Patient came in with the complaint that she could not micturate, and thought she was aborting. The uterus was replaced, and patient went out well, without any threatening of abortion.

Adherent Placenta.—Two cases, one entirely adherent, the other adherent in its upper part. In the latter case severe hæmorrhage set in about five minutes after the birth of the child, but ceased on artificially removing the adherent portion of the placenta. In two cases there was partial adhesion of membranes, requiring artificial removal.

Torn Perineum occurred in a few cases. In no case was the sphincter ani implicated, and most were trifling. Silkworm gut was used to stitch them, union being perfect in all cases. One patient on admission was found to have an old tear, which had passed into the rectum. This was repaired on the second day of the puerperium by Simpson's method.

Ophthalmia Neonatorum.—In all cases the eyes were washed with corrosive sublimate lotion (1 in 10,000), and in the majority of cases with 1 per cent. nitrate of silver solution. In one case the latter caution had been neglected, and unfortunately this child took gonorrhœal ophthalmia.

Puerperium.—In one case the temperature rose suddenly to

102°·2 F. on the eighth day. The source of infection was traced to a cystitis the patient had on admission, the septic matter being probably carried up the vagina by the douche-tube. The uterus was douched out twice, and all vaginal douchings stopped, the temperature falling to normal in two days. In a second case a rise of temperature occurred on the second day, from a piece of retained membrane, which came away on douching the uterus. Next day temperature was normal. In a third case the temperature rose to 100° F. on the fourth and fifth evenings, and to 102° F. on the sixth, being normal in the mornings. Next day, without any treatment, it fell to normal, and remained there. The patient was otherwise perfectly well; lochia sweet, and no tenderness. Cause unknown, unless mental worry had some influence.

Mortality.—Maternal, 1, from uræmia, and commencing acute yellow atrophy of the liver (?) See special report. Infantile, 2. One died on fifth day; it was a twin child, and small and weakly. Second died in nine and a half hours, from cerebral hæmorrhage. Fœtal, 7. Two were putrid (syphilitic), 1 in case of induced labour for deformed pelvis, 1 in craniotomy for deformed pelvis, 1 in case of justo-minor pelvis in which high forceps were applied, 1 from prolapsus funis, and 1 with enlarged abdomen preventing respiration.

The following cases call for special attention:—

Case of Cardiac and Renal Disease, and Goitre; recovery.

E. F., i.-para, age 27. Father and mother both had heart disease, and her mother and sister goitre. Patient had scarlet fever, but never rheumatism. Goitre had existed for four years, but increased rapidly in size during pregnancy. For several months had swollen ankles, and was subject to fainting attacks. A month before admission urine became scanty, and a fortnight later, after being exposed to cold, it became more scanty and thick. She also had lumbar pains, vomiting and diarrhœa, and general malaise.

On Admission.—Face puffy, ankles œdematous. Great enlargement of thyroid, causing slight dyspnœa. Presystolic and systolic mitral and aortic systolic murmurs and hypertrophied left ventricle. High tension pulse. No retinitis. Urine showed large amount of albumen, blood, tube casts, and urates.

Treatment.—Cupped over the back, and vapour bath. Bowels kept loose with Pulv. jalap co. Milk diet. Labour progressed favourably, no artificial interference being required. She progressed favourably, and left Hospital much improved, although the goitre and cardiac condition remained the same.

Case of Albuminuria.

J. Y., æt. 21, i.-para. Urine on admission was found to contain 1·7 grs. of albumen per ounce, also numerous granular-looking tube

casts. Beyond this there were no other symptoms whatever. The labour was complicated by the child's hand prolapsing alongside the head, delaying the latter at the outlet, and requiring use of forceps. Milk diet. After this the albumen rapidly diminished, and by the third day had disappeared.

Case of Eclampsia, with Post-eclamptic Mania and Septicæmia; recovery.

Mrs W., æt. 17, i.-para; attended by a midwife outside, and admitted in a comatose condition three and a half hours after parturition.

This case illustrates a condition of transitory mania after eclamptic seizures analogous to the maniacal attacks that are seen during the post-paroxysmal period of epileptic fits. There was a further complication of septic poisoning, the source of which is doubtful, the case being attended to by an outside midwife.

History.—For her age patient is very childish and emotional. Father a drunkard, mother very hysterical. No previous history of nephritis. For latter three months of pregnancy had œdema of hands and feet, and in the morning puffiness round the eyes. These conditions were aggravated during the last three weeks preceding her confinement.

Labour was an easy one, the child being very small. The midwife noticed one hour after the child was born what she called a hysterical fit. According to patient's statement (got afterwards), she remembered nothing of what happened from two hours before the child was born until she regained consciousness, nearly twenty-four hours after admission to Hospital. The placenta not coming away, a doctor was sent for, and finding her also comatose, ordered her to Hospital.

Condition on Admission.—No anasarca, but œdema at bases of both lungs; comatose; laboured respiration, and marked cyanosis of face and lips; accentuated second cardiac (aortic) sound; high tension pulse. Urine contained 4·3 grs. albumen per ounce, urea 3 grs. per ounce, hyaline tube casts, and blood corpuscles.

Patient was cupped over the kidneys, and 7 ounces of blood taken from arm. Vapour bath, croton oil, and pilocarpin. Chloroform for fits, and chloral per rectum.

Patient had nine fits after admission, these being of the usual epileptiform character, and not ushered in by a cry. As the fits progressed the temperature rose, until at the ninth it was 102°·8 F., the pulse being 146. The superficial reflexes seemed normal, but the deep reflexes were absent, and did not return till next day.

Post-eclamptic condition was first one of deep coma, gradually passing into a more or less drowsy condition, with marked confusion and inability to understand or answer questions. This drowsy condition gave way in its turn to one of acute mania. The patient became irritable, restless, and excited. She would struggle to get

out of bed, and throw off the clothes and fight with those holding her. Again she would lapse into an emotional state with sobs and tears, and call on her husband by name, this to be again followed by struggling, shouting, and swearing, until quietened by the administration of chloroform.

She had well-marked delusions of identity, and those around her, whether doctor or nurse, were mistaken for her husband. Chloral and bromide seemed to have no effect, so the patient was kept more or less under the influence of chloroform all night for nearly twelve hours after she had the last eclamptic seizure. About twenty-four hours after admission she became conscious, and, although somewhat drowsy, could recognise where she was and as to the identity of those around her. For the next seven or eight days the patient remained more or less drowsy, though rational, and slept most of the time.

Under treatment and milk diet the albumen gradually lessened, until it disappeared on the twenty-sixth day. The temperature remained between 100° and 102° F. till the twelfth day, when it gradually fell until it became normal on the sixteenth day, and remained so. For the septic condition she was treated with iron and digitalis and stimulants, and carefully douched. The patient left Hospital quite cured on the twenty-seventh day.

Case of Chronic Bronchitis, Emphysema, and Dilated Right Heart.

Mrs C., vi.-para, æt. 42; suffered from chronic bronchitis for ten years, the condition being aggravated by each labour.

On admission patient had commenced to be in labour. She had great dyspnœa, and her face was cyanosed. She had no valvular lesions, although the right ventricle was dilated. Strophanthus was given. Whenever the os was fully dilated and the membranes ruptured, chloroform was given, and the child delivered by forceps. The dyspnœa was relieved by the chloroform, but whenever the placenta was delivered there was a renewal of cyanosis and increased dyspnœa. Strophanthus and ether were given hypodermically, and nitrite of amyl inhaled, and the chest dry cupped. The patient improved rapidly, and was discharged convalescent on the eighteenth day.

Craniotomy for Justo-Minor Pelvis.

A. M., æt. 28, i.-para; height, 4 ft. 4 in.; rachitic, deformed, and stunted. Pelvis: Intercristal diameter, 9 in.; interspinous, 8 in.; external conjugate, 7 in.; diag. conjugate, 4 in. It was also contracted more on the left side. Abdomen very protuberant.

During the first stage of labour the cord prolapsed, but no attempt was made to replace, as craniotomy had been decided on. When the os was fully dilated, the head, which lay in the transverse diameter with occiput to right, was perforated, and the fœtus ex-

tracted by Braun's cranioclast. Child was a large one, weighing 8 lbs. Patient made a perfect recovery.

Case of Pregnancy, Nephritis, Uræmia, and Commencing Acute Yellow Atrophy.

W. M., æt. 24, i.-para, admitted 8th April 1891; has congenital syphilis. On her admission the os was found to be slightly dilated, admitting the forefinger, and patient stated that the waters had come away sometime before. Pulse was of high tension; and a history of headaches and vomiting during last six weeks of pregnancy was suspicious of nephritis, but a catheter obtained no urine. Some hours later, the urine obtained contained albumen, hyaline and granular casts. She was cupped, purged, and given a vapour bath, and put on milk diet.

April 10th.—Labour progressed very slowly, and it was late in the afternoon of the 10th before the os was fully dilated. Four hours later, the patient becoming exhausted, and the head not advancing, forceps were attempted to be applied, but the blades would not lock. An hour later, however, after further head moulding, they were applied successfully. The child weighed over 10½ lbs., and had a very large head, which accounted for the delay.

April 11th.—Complains of pains in the limbs, want of appetite, and is slightly jaundiced. Up to this time the vapour baths were being continued and the bowels kept acting, the patient being on milk diet.

April 12th.—Urine showed ½ gr. of albumen per ounce, and contained casts and bile. No leucin or tyrosine. The patient complained of headache and general malaise. Pulse weak; temperature 98° F. Towards evening the patient began to show signs of dyspnœa, and the pulse was weaker. Abdomen greatly distended and tympanitic. Patient was freely stimulated, and the abdominal distension relieved by passing a rectal tube. At midnight the pulse was 86, and very weak; temperature, 98°·2 F. Patient very restless, turning about in bed, and constantly calling out. Lungs were œdematous. Patient remained jaundiced, though not deeply, and the liver was not diminished in size. She had a vapour bath, was cupped, and freely stimulated, and strophanthus given. Dyspnœa increasing.

April 13th.—As the morning advanced the pulse became weak and thready, and the respiration very laboured, the temperature falling to 96°·2 F. Pupils dilated. By 6 A.M. patient was becoming comatose, and an hour later was quite so, the pupils not reacting to light. She died at 8 A.M. The urine last drawn off contained ·2 grs. albumen per ounce, abundance of tube casts, but no leucin or tyrosine; urea, 8·6 grs. per ounce. The urine was further examined by Dr Middlemass, who found an abnormal amount of urobilin.

Post-mortem Examination.—No evidence of septic mischief, and the pelvic organs were healthy. There was a large retroperitoneal

hæmorrhage, evidently coming from the spleen, and extending downwards nearly to the fourth lumbar vertebra. Spleen was enlarged, and very soft and pulpy. Liver enlarged, soft, and fatty looking. Both kidneys were much congested, soft, and flabby, and there were two small cysts (size of marbles) in the left. No thrombosis of pulmonary vessels. Microscopic examination of the liver showed great destruction of its cells, the structure being quite obliterated.

Extern Cases.

During the quarter 162 women were treated at their own homes, and of these 27 were primiparæ and 135 multiparæ.

Classification of Labours.—Natural, 134; laborious, 8 (instrumental 7, lingering 1); preternatural, 8; complex, 5; abortions, 7 —total, 162.

Presentations.—I. Cephalic: (1.) Vertex, 147; (2.) Brow, 1; (3.) Face, 1. II. Pelvic: Breech, 6.

Positions.—(1.) Vertex cases: L.O.A. 138, R.O.A. 3, R.O.P. 5, L.O.P. 1. (2.) Face: L.M.A. 1. (3.) Brow: R.O.P. 1. (4.) Breech: Right coxa-cotyloid dorso-anterior (L.S.A.) 6.

Natural Labours.—8 of these were premature—2 at sixth month, and 6 at seventh month; 2 of these were born putrid. Of the latter, 1 died in four hours, another in twelve hours, and 2 lived.

Laborious Labours.—(1.) Lingering: 1 case due to wedging down of anterior lip of cervix. (2.) Instrumental: Forceps were used in 7 cases—2 cases justo-minor pelvis, 2 cases simple flat pelvis, 2 cases inertia, and 1 case due to large size of child.

Preternatural Labours.—6 breech cases. In 3 the child was born dead; 1 face case, and 1 brow case.

Complex Labours.—5 cases. (1.) Hour-glass contraction of uterus; (2.) Central placenta prævia—death of child (eighth month); (3.) Prolapsus funis—death of child; (4.) Adherent placenta; (5.) Post-partum hæmorrhage from rupture of varicose veins in vagina.

Abortions.—7 cases, all at third month.

Adherent Placenta.—The House Surgeons were summoned to several cases, but in only one was it adherent, and that in nearly its whole extent.

Sex of Children.—90 males, 65 females.

Mortality.—Maternal, 0. Infantile, 3. One died in four hours, another in twelve hours, both seventh month children; the third child died on tenth day with cachectic pemphigus. Fœtal, 16. Five were putrid, and 11 still-born. Of the former, 3 were syphilitic, the other 2 not having been examined. Of the latter, 3 were breech cases, 1 a case of syphilitic fatty placenta, 1 justo-minor pelvis for which high forceps were used, 1 prolapsus funis, 1 premature at sixth month, 1 forceps for delayed labour due to large child, 1 central placenta prævia at eighth month, and in 2 cases cause unknown.

MEETING IV.—FEBRUARY 10, 1892.

DR PLAYFAIR, *Vice-President, in the Chair.*

I. *Dr John Thomson* exhibited the ORGANS from an infant with multiple congenital abnormalities.

II. NOTES ON A CASE OF PLACENTA PRÆVIA.

By G. OWEN C. MACKNESS, M.D., Broughty Ferry.

THE condition of placenta prævia carries with it such enormous risks to the patient and so much anxiety to the medical attendant, that I feel justified in bringing before you the following notes of a case in which there were in addition some rather unusual complications.

Mrs M——, aged about 40, came on October 6th, 1891, asking me to attend her in her confinement, which she expected about the end of November. She stated that she was pregnant for the eighth time, and that at her last confinement she had been delivered of twins. All her previous labours had been quite normal, and in them she had only had the assistance of a neighbour; this time, however, she felt some unaccountable nervousness, and wished the attendance of a medical man. She was perfectly well except for some slight dyspepsia, which simple treatment at once corrected.

Nothing further was heard of her until December 2nd, when a note came from her husband to say that for the last two days she had not been feeling very well and would like to see me. I visited her that day, and found her engaged in her ordinary household duties; but she stated that for the two previous days there had been some pains, and that on this morning slight hæmorrhage had commenced. Per vaginam examination showed that she had reached her full term. The os uteri barely admitted the tip of the forefinger, and the membranes, which could only just be reached, felt slightly thickened. Through the cervix nothing abnormal could be detected, and there was no unusual pulsation. The case seemed to be one of slight accidental hæmorrhage, and was treated as such, while strict orders were left that if the hæmorrhage returned she should send for me at once. At 2.30 P.M. next day I received a message asking me to call and see her, and on reaching her at 3.30 P.M. I found that she had unfortunately neglected these orders. There had been severe hæmorrhage at 4.30 A.M., which lasted for over three hours, and at 11 A.M. infrequent pains commenced, each pain being accompanied by a great gush of blood, and this was still going on when I arrived. She was lying in bed almost pulseless, the extremities cold, and lips blanched; the mattress was saturated with blood, which had run down and formed a large pool on the floor.

On examination the vagina was found to be full of clotted blood, and after clearing this out the os uteri could be felt to be the size of a florin, while the condition was easily diagnosed to be that of complete placenta prævia. The pains were recurring about every fifteen minutes, each one being accompanied by a great gush of blood, while there was a steady oozing in the intervals. The presentation was vertex, R.O.P., and the os was fairly dilatable. After being surrounded with hot bottles and the administration of stimulants she began to rally, and so introducing my hand into the vagina and dilating the os, I tried to reach the edge of the placenta, which could be easily separated in all directions except posteriorly, but failed to do so; then pushing two fingers through the placenta and manipulating over the abdomen with the other hand, the right leg was seized and brought down through the placenta and os uteri. Ergot and more stimulants were given, and she rallied well, but there was no increase in the frequency of the pains, while the hæmorrhage still persisted; so again passing two fingers into the uterus, the left leg was seized and brought down also. The bleeding now ceased entirely, and her condition rapidly improved. Her pulse became fairly good, although still about 120 per minute. She took some hot tea and more ergot, without any improvement in the pains, however. Owing to the large surface of placenta which had been separated in trying to reach its edge, and the great amount of hæmorrhage, it was obvious that if the child's life was to be saved the labour must be hurried as much as possible, and so I proceeded to aid the pains by expression. By 5 P.M. the body of the child was through the os uteri, but it was found impossible to make any further progress, and on examination this was seen to be due to the cord, which, as it ran from the umbilicus, turned posteriorly to its attachment to the placenta on the anterior surface of the uterus, passed between the child's legs, and so suspended it in the vagina by its shortness, and prevented any further descent of the child until the placenta became detached or the cord itself was divided. There was, therefore, now no hope of saving the child; and after ligaturing and dividing the cord, the delivery was completed at 5.15 P.M. The child was a large, well-developed male, and dead. The uterus contracted well; but as the hæmorrhage continued, and the placenta could not be expressed owing to considerable adhesion posteriorly, it was peeled off and delivered. It was of large size, and had a considerable rent almost in its centre, through which the child had been delivered. The cord was attached very near to what had been its anterior margin, and was extremely short, thus explaining how it had got between the child's buttocks when version was performed, and so impeded delivery. The hæmorrhage now ceased almost entirely, and the uterus contracted well. The patient was of course suffering considerably from shock and loss of blood, the pulse being weak and rapid, and the extremities cold; but after

the administration of hot tea with stimulants, and the renewal of the hot bottles, she rapidly rallied and spoke calmly, expressing her relief that all her troubles were over. Suddenly at 5.45 P.M. she complained of a sharp pain, which she definitely localized to a spot just to the right of the centre of the sternum. Her respirations became rapid and shallow, her pulse rapid and weak again, and her face cyanosed, while she commenced to vomit. Stimulants were freely given, but she rapidly grew worse, still complaining of the acute stabbing pain, which she definitely localized. At 6.15 P.M. she became unconscious, and died at 6.30 P.M. There can be little doubt that this sudden and unexpected termination of the case, just when she seemed as if the worst of her troubles were over, was due to an embolus which had escaped from the uterine sinuses and lodged in the pulmonary artery.

Among the points of interest in this case was the strange and unaccountable foreboding of trouble in this labour which induced her to seek medical aid in it, although on former occasions she had been content with the assistance of an unskilled neighbour—a foreboding for which no cause can be found, as her pregnancy had in every way been normal. Here, too, we had to deal with one of those cases where there was no previous warning of the condition, and where it was not possible to diagnose it from accidental hæmorrhage, even on the day preceding the labour.

Perforation of the placenta has not many advocates, except in cases such as this, when it is found impossible to reach the edge of the placenta. Playfair[1] says that in complete placenta prævia, "although many authorities advise the penetration of the placenta itself, I am inclined to think that it would be better to abandon the attempt and trust to other methods of treatment." It is difficult to see what method of treatment other than turning, and so plugging the os uteri with a leg of the fœtus, was feasible here. Barnes' bags could not have been retained in the cervix; and even if the vagina had been plugged, the large size of the placenta, and the consequent difficulty in reaching its edge, would still have rendered its perforation necessary.

The passage of the cord between the legs of the fœtus was due to the necessity of bringing down both legs, and could not well have been detected, owing to the small hole in the placenta through which it was necessary to work. It would have caused no trouble had the case not been complicated by the extreme and unusual shortness of the cord.

The mother rallied wonderfully, and her chances of ultimate recovery seemed very fair but for the unfortunate further complication of pulmonary embolism which supervened. Coagulation of the blood is especially liable to occur in cases where there has been severe hæmorrhage; and Merriman has noted that phlegmasia

[1] *Science and Practice of Midwifery*, vol. ii. p. 96.

dolens is relatively a common occurrence in placenta prævia[1] owing to this; moreover, in those cases where death occurs from pulmonary thrombosis, a large number are found to have suffered from severe post-partum hæmorrhage.[2] In this case the great loss of blood, and the consequently weak circulation, favoured the formation of thrombi in the uterine sinuses, and then, when the circulation grew stronger as she commenced to rally, one of the newly-formed clots must have separated and been driven into the general circulation. It is very rarely, however, that embolism occurs so soon after delivery, being much more frequent at a later period.

The Vice-President thought the Society was much indebted to Dr Mackness for bringing this interesting case before them. Placenta prævia, fortunately, did not happen frequently, but when it did occur it demanded all the skill and resource at their command, and it was well they should have the rules of treatment clearly in their minds, so that there should be no delay or hesitation in their application. He would like to point out one risk in the treatment which perhaps was not always sufficiently attended to, namely, the too great hurry there often was to complete delivery. No doubt the life of the child ought always to be kept in mind, and in these cases a living child should always be aimed at, and was something to be proud of, but the life of the child was not to be weighed for a moment against that of the mother, and he felt sure that rapid delivery meant greater shock to the mother, probably already much exhausted by hæmorrhage. There was, besides, the risk of cervical tearing and more loss of blood from such a source. He had had a painful experience of such an occurrence, and these risks had greatly impressed themselves upon him. After a leg was brought down, little or no further hæmorrhage could take place, and due time should then be taken to avoid shock and cervical tearing in the mother.

Dr Berry Hart thought Dr Mackness's case of interest. The management was excellent.

Dr J. W. Ballantyne had seen a case of partial placenta prævia, in which an incident somewhat similar to that in Dr Mackness's case had occurred during the puerperium. The confinement took place at the sixth month after a pregnancy which had been characterized by severe hæmorrhages on several occasions; the examination of the placenta showed that it had partially lain in the cervical zone, and some days after the delivery the mother, who was very anæmic, developed phlegmasia alba dolens of the right leg. On another occasion Dr Ballantyne had seen two cases of central placenta prævia on the same day; one was a Maternity case, the other occurred in Prof. Simpson's private practice. In

[1] Leishman, *System of Obstetrics*, p. 710.
[2] Playfair, *Science and Practice of Midwifery*, vol. ii. p. 369.

both cases it was necessary to pass the hand directly through the placental substance in order to draw down a leg, and so check the bleeding. In one of these cases there was, in addition, a severe hæmorrhage after the termination of the labour, probably from too rapid dilatation of the cervix. He thought that the treatment adopted by Dr Mackness was the right one in cases of central placenta prævia.

Dr Mackness replied.

III. ON TWO CASES OF VAGINAL HYSTERECTOMY FOR SARCOMA OF THE UTERUS.

By N. T. Brewis, M.B., F.R.C.P.E., Lecturer on Gynæcology, Edinburgh Medical School; Gynæcologist, New Town Dispensary; Secretary, Edinburgh Obstetrical Society; formerly Assistant to late Physician for Diseases of Women, Edinburgh Royal Infirmary.

While to Virchow we are indebted for placing sarcoma on a definite pathological basis, we are under a debt of obligation to two of our most distinguished Fellows for making clear to us the clinical features of sarcoma of the uterus. Prof. Gusserow in 1870, and our President, Prof. Simpson, in 1874, were among the first to elucidate to us the symptoms, physical signs, and treatment of this disease. As far as I know, Prof. Simpson's paper is the only one which has appeared in our *Transactions* on the subject, so I think it is especially fitting that I should record here my unique experience of having two cases of sarcoma of the uterus under my care at the same time.

The following report of the cases, as well as the microscopical sections, have been kindly prepared for me by Dr Aitken Clark:—

Case I.—Mrs M., a widow, 43 years of age, mother of one child born sixteen years ago, enjoyed good health till June of last year, when a fortnight after her usual menstrual period the flow reappeared, and she felt as if something had "given way." This discharge continued profuse, of a bright red colour, occasionally containing "lumps" for seven days, after which it changed to a "dirty water colour," and at the same time became very offensive, the smell resembling that of a tan-yard. There was no pain. The discharge at her periods previous to this illness had been gradually becoming less.

On August 7th she was admitted into the Edinburgh Hospital and Dispensary for Women and Children, and the following report I received from the Resident, Miss Jessie Macgregor:—

"On admission she was bleeding profusely, and the smell was most offensive. A large friable mass was found projecting into the vagina from the cervix. A considerable portion of this was removed by the hand, and the vagina douched with a strong solution of carbolic acid. Pieces continued to come away for some

days, and the discharge had not quite ceased when menstruation appeared on the 29th of August. Three days afterwards a polypus was again felt projecting into the vagina, and two days later a piece the size of a hen's egg became spontaneously detached. On the 9th the os was found dilated and a polypus again protruding. On the 12th as much of the growth as could be reached was removed, and for twelve days the discharge was slight in quantity, and serous in character. On the 25th excessive hæmorrhage occurred, and the tumour was made out as large as ever. On October 1st a large friable mass the size of a closed fist was removed by the ecraseur. Eleven days afterwards the tumour reappeared."

On the 17th, late in the evening, alarming hæmorrhage set in, and Dr J. A. Clark was asked by Miss Macgregor to see the patient. On entering the room the smell was very offensive. The patient was very pale, with a pinched, anxious expression; the brow was covered with cold, clammy perspiration, and every now and again she drew long sighs. The temperature was sub-normal, the pulse was weak—120 per minute. The hæmorrhage was very free. On introducing the fingers within the vulvar orifice a large, soft, friable mass was encountered, which filled the whole vagina, and broke down readily, emitting a very disagreeable smell. At the upper part of the tumour a broad pedicle was felt passing up through the dilated cervix, apparently to the anterior wall of the uterus. The uterine body was large and movable.

Dr Clark kindly sent for me to see the case. I found the patient's condition as described above. I advised that the vagina should be plugged for the night, and that the tumour should be removed next day. Dr Grace Thompson, physician in charge of the hospital, was good enough to ask me to perform the operation, which I did, assisted by her, with the ecraseur and curette, removing the whole tumour down to the base of the pedicle. I was now able to make a thorough bimanual examination, and finding the broad ligaments clear and the uterus movable, I advised extirpation of the entire organ. To this proposal the patient and her friends readily consented. Accordingly, on the 26th October Mrs M. was removed to the Cambridge Street Home for Women, and on the following day I performed vaginal hysterectomy.

The patient was put in the lithotomy position, the vagina was douched with carbolic lotion, a sound was introduced into the bladder and held there; spatulæ held the labia apart, and the uterus was drawn down with a volsella. The anterior fornix was cut through with scissors, and the cellular tissue between the uterus and bladder cleared. The posterior fornix was treated in the same way. The utero-vesical pouch of peritoneum was pierced with sinus forceps, and the opening enlarged to the sides of the uterus. The pouch of Douglas was opened in a similar manner, and a warm antiseptic sponge with string attached

pushed through the opening to keep the bowel and omentum, which were easily seen, out of the way. Greig Smith's clamps were tried, but on account of the large size of the uterus, the high position of the broad ligaments, and the narrowness of the pelvis, their application was found to be impossible. I therefore ligatured the ligaments with No. 6 silk in the following manner:— A portion of ligament was grasped in pressure forceps, a ligature passed through a corresponding part of the ligament on a blunt needle was firmly tied, and the ligament cut away close to the forceps. This was done alternately on each side of the uterus, until both ligaments were tied and divided. By alternately ligaturing each side the uterus can be drawn further down, so that the application of the next ligature is made easy. The pelvic cavity was then thoroughly douched with carbolic lotion, and wool impregnated with iodoform was placed over the vulva. The vaginal roof was not stitched, and no drainage-tube was used.

On the evening of the 28th, while being douched, the patient suddenly complained of pain in the abdomen, then she stared, held up her hand, and became slightly convulsed. Unconsciousness followed, and the breathing became rapid and loud. The pulse, which at the commencement of the attack was 84, rose to 160, and her face became bathed in cold, clammy perspiration. The pupils were equal, and reacted to light. Restoratives were applied, but she continued in the above state for three-quarters of an hour, then she vomited coffee-ground material and gradually recovered consciousness.

With the exception of this interruption her recovery was continuous. Three grains of calomel were given at intervals of four hours till flatus passed. Hot antiseptic douches were given every four hours. On the fifth day the discharge became and continued very offensive until the fifteenth day, when the ligatures came away. The bowels moved on the third day. The temperature on the afternoon following the operation rose to 100°, next day it registered 99°·5, after which it became and remained normal. The pulse varied from 100 to 130 during the first three days after the operation. On the eighteenth day the vaginal roof was inspected with the aid of Sim's speculum and was found closed, a portion in the centre about the size of a half-crown piece being covered with a purulent discharge. The patient was allowed to get out of bed a month after the operation, and was discharged on December 20th feeling strong and well.

Naked Eye Appearance of Uterus. — Weight, 6¼ oz.; length, 4⅞ in.; breadth at broadest part, 2⅛ in. External os was patulous, and admitted tip of finger. In the anterior wall of the body of the uterus is a small fibroid. On laying open the uterus, the remains of the pedicle of the tumour are seen as a distinct projection of soft consistence on both walls immediately above the internal os. The mucous membrane in the immediate neigh-

bourhood of the pedicle was much injected, but at the fundus it was apparently healthy. The walls above the pedicle were much thickened,—the posterior measured $\frac{7}{8}$ths, and the anterior $\frac{5}{8}$ths of an inch.

Microscopic Examination.—Sections were made through the uterus at the site of the pedicle and subjected to microscopic examination. They showed a fibro-cellular basis, in which were numerous acini, some of small size, others of considerable dimensions. These were lined by columnar epithelium placed on a homogeneous basement membrane, each cell having a distinct nucleus and nucleolus situated near the base. The cells lining a great many of the acini were undergoing degenerative changes, and in some instances their interior was filled by degenerated cells and proliferating connective tissue corpuscles which had extravasated through their walls.

A portion of the tumour removed by Dr Grace Thompson in September was examined by Dr Bruce (late senior Pathologist to the Royal Infirmary), who said it was a myxo-sarcoma, the myxomatous tissue predominating. He also examined the pedicle of the tumour removed in October, and again pronounced it to be a myxo-sarcoma.

Dr Clark made sections of the tumour—1. Near the base of the pedicle. This section showed remains of adenomatous tissue, with at parts round sarcomatous cells intervening. 2. Further from the base, showing round sarcomatous cells only, the acini being absent. 3. Still further from the base, the sarcomatous cells had in parts disappeared, and were replaced by myxomatous tissue.

CASE II.—Mrs D., æt. 49, mother of eight children, the youngest being 11 years old, was recommended to me by Dr Thin, and was admitted into the Home in February 1891 complaining of profuse bleeding. Her menstruation was regular till two years ago, when it ceased for two or three months.

In September 1890 it reappeared; the discharge, which at first was slight and intermittent, soon became persistent and copious. It was odourless, however, and was unaccompanied by pain. Her general health was fairly good. Her grandmother, mother, and some of her maternal aunts, died of cancer.

On examination both Bartholinian ducts were found distended with pus. The vaginal portion was large, its mucous membrane healthy; the external os was gaping. The body of the uterus was retroverted, enlarged, and freely movable. The sound passed $3\frac{1}{2}$ inches. The interior of the uterus was rough and irregular. Curetting was performed. The scrapings were mislaid, and consequently no microscopical examination was made, but their soft, brain-like appearance was noticed at the time. The patient was dismissed on 24th February feeling well.

On October 30th she was re-admitted complaining of constant discharge of blood. This discharge returned immediately after she left the Home, and was very profuse for about a month; then there was an interval of more than two months during which there was very little discharge, but in July it returned as copious as before, and became distinctly fœtid. There has been complete immunity from pain. The uterus was again found enlarged and retroverted. On introducing the speculum, blood was seen to pour through the dilated os in a constant stream. The smell resembled decayed vegetables. The sound passed 3½ inches; the endometrium felt rough. Curetting was again performed, and the scrapings, which were large in amount and of a soft, pulpy, brain-like consistence, were examined microscopically, and found to contain numerous round and spindle-shaped sarcomatous cells.

The patient consented to have her uterus removed, and this was done on 8th November. The operation was similar to Case I., with the exception that both ovaries were removed. She stood the operation well. Flatus passed on the same evening. The temperature at 8 P.M. on the day of the operation rose to 100°·4, and the highest that it registered afterwards was 99°·8 on the morning of the 9th. The pulse varied from 114 to 130 until some hours before her death, when it could not be counted. The patient continued to progress favourably until the 11th, when she complained of pain over the stomach. The abdomen was uniformly distended, and on palpation there was distinct tenderness in the epigastric region. There was also a limited area of dulness on percussion. In the evening vomiting set in, and the distension became more marked. Several enemata containing turpentine were given, besides castor oil by the mouth, but the bowels refused to act. The temperature did not rise; the pulse, however, became more rapid; retching was more or less continuous, and the patient died next morning. On post-mortem examination, the interior of the abdominal cavity was covered with recently formed lymph, and the intestines were matted together. A little pale-coloured fluid was found in the cavity. No mechanical intestinal obstruction was discovered. The vaginal roof was firmly closed.

Naked Eye Appearance of Uterus.—External measurement, 4 inches; internal measurement, 3½ inches; weight, 5 oz.

On section the interior was smooth, except a small portion in the upper left corner, where the mucous membrane had not been removed by the curette. This had a rough, irregular appearance, a pale yellowish colour, and was of soft consistence. The thickest part of the wall measured an inch.

Microscopic Appearance.—A small film of the scrapings put on a cover-glass, dried, and stained with picro-carmine, showed numerous round and spindle-shaped cells. No glands were seen in this specimen, but in a section of the scrapings, hardened in

absolute alcohol, and made by the paraffin method, great hyperplasia of the utricular glands was manifest. These were lined by columnar epithelium with a nucleus and nucleolus, and placed in a basement membrane. In some of the glands the cells were in a state of cloudy swelling, and in others they were undergoing degenerative changes. The connective tissue was cellular, and intermingled with, and in some places replacing it were large round cells. A section of the uterine wall showed hypertrophy of the muscular fibres, but was otherwise normal. No mucous membrane was seen, showing that it had been entirely removed by the curette, and had not grown in the interval between scraping and removal.

Remarks.—In the above we have examples of the two forms of sarcoma of the uterus—the circumscribed and the diffuse. The ages of the patients were 43 and 49 respectively. Both were parous women. One has been a widow for a number of years, and has had one child; the other was the mother of eight children. One patient had reached the climacteric, and had ceased to menstruate for some time before the disease manifested itself; the other menstruated regularly till the disease set in. In both there was absence of pain.

In the first case narrated—that of the circumscribed variety—what strikes us most is the rapidity with which the disease recurred after removal. The soft, friable, bleeding, stinking tumour was partially removed on August 7; less than a month later it was found to be as large as ever, and the greater part of it was again removed. Nine days after it was found as large as before. After being again removed, it was ascertained to have reached its usual dimensions eighteen days subsequently. On this occasion it was completely removed with the ecraseur, and when I first saw the patient, seventeen days after this operation, I found the vagina occupied with a soft, friable mass the size of my fist, and having the feel of a cauliflower excrescence. This illustrates the recurrent nature of the circumscribed form of sarcoma. On account of the myxomatous character of the tumour this tendency was perhaps more marked in the present case. Portions of the tumour removed on two occasions were examined by Dr Bruce and pronounced to be myxo-sarcomatous, while Dr Clark's sections of the base of the pedicle were found to present the characters of a simple adenoma. We may, therefore, infer that this tumour was originally an adenoma which had undergone myxo-sarcomatous degeneration.

In case No. II. the endometrium was uniformly thickened to the depth of ¼ inch by soft, white brain-like tissue, which the curette cut easily through, and which on microscopical examination was found to be made up of round and spindle-shaped sarcomatous cells, the former predominating. The uniform distribution of the

disease over the whole of the interior of the uterus shows it to be an exceptionally good example of the diffuse form of the disease.

The result of the operation in this case I deeply regret. First, because if the patient had recovered a recurrence of the disease was very improbable; and, secondly, because I think the fatal termination might have been averted. Death was from septic peritonitis, and the infection was undoubtedly got from patient No. I., who was operated on a few days previously, and from whom there came the copious offensive discharge caused by the sloughing of the broad ligament. The two patients were in adjoining rooms, and if I had kept them farther separate I believe the result would have been different.

With regard to treatment, there can only be one opinion, viz., that as these growths are malignant, the proper procedure is to remove the whole uterus. If such a measure is justifiable in cancer, it is much more so in sarcoma, because in the latter we can almost with certainty remove the whole disease, because it is in most cases limited to the uterus. As soon as the diagnosis has been made by microscopical examination of the scrapings, the interior of the uterus should be emptied with curette or ecraseur, and then the entire organ should be extirpated. Repeated removal of the tumour is only palliative, and does not save the patient from death, which sooner or later ensues from the exhaustion brought about by the continued discharges.

In a paper which I read before the Society last year on "Vaginal Hysterectomy for Carcinoma of the Cervix," I eulogised the use of clamps for securing the broad ligaments. In the case there narrated the clamps answered well, but in those recorded to-night I found it necessary to tie the broad ligaments with silk. I could not apply the clamps because the uteri were enlarged, and the upper margins of the broad ligaments could not be reached by the fingers. Still, whenever practicable I would use the latter, because with them the operation is shorter and easier, and there is less danger of shock afterwards. In neither case did I stitch the vaginal roof nor use a drainage-tube. I do not think the former procedure is necessary, and frequent irrigation appears to me to answer better than drainage. In both of the cases there was great shock after the operation—shock more profound than one is in the habit of seeing after abdominal hysterectomy. The convulsive seizure which is narrated in Case I. two days after operation, and which ended in recovery after the vomiting of coffee-ground material, I attribute to shock. These symptoms, I am told, are not uncommon in the shock following severe accidents. On the fourth day after operation in the same case the discharge became copious and very offensive, and continued for several days without giving rise to any constitutional disturbance. The smell is due to the sloughing of the cut ends of the broad ligaments, which have been strangulated by the ligatures. The wonder is that there is no

absorption of this putrid material, which must be in contact with the peritoneum. After the ligatures came away, which they did "*en masse*" on the sixteenth day, the discharge and smell ceased.

To Drs Russell and Bruce I am much indebted for their valuable advice regarding the microscopical sections; and to Drs Thompson, Thin, Macdonald, and Clark for kind assistance at the operations.

The Vice-President was sure he was expressing the feeling of the Society when he said that they were all greatly obliged to Dr Brewis for the very able account he had given them of the two rare and interesting cases which had come under his care and treatment. The very clear narration of the symptoms would enable the Members to keep them well in recollection, and they would thus be all the more able to recognise a case of the kind when it came under observation. He had no doubt as to the soundness of the line of treatment pursued by Dr Brewis. Extirpation of the whole uterus was the only procedure which gave a fair prospect of success. Though, doubtless, it would have been very pleasing to Dr Brewis, and to all here present, had both cases recovered, yet where such a severe operation was involved, he was to be greatly congratulated on the successful issue of the first case. He (the Vice-President) had had no experience of a case of sarcoma of the uterus; but about three years ago he had under his care a young girl suffering from a large sarcoma of the ovary. She was only 11 years of age, and was operated on by his friend Dr Halliday Croom. The case was one of a series of ovarian cases published by Dr Croom a short time ago. The tumour was successfully removed, and the patient made an excellent recovery, but died some eighteen months afterwards, probably from extension of the disease to the peritoneum and neighbouring organs.

Dr P. Strassmann (*Berlin*) quite agreed with Dr Brewis, that the total extirpation of the uterus is the only satisfactory and justifiable operation in every case where a malignant growth exists in the corpus uteri, provided it has not yet attacked the neighbouring organs, especially the broad ligaments. As for the origin of the sarcoma of the uterus, there were, besides the primary sarcomatous tumours, certain cases in which a sarcomatous degeneration took place in a fibroid. Perhaps that was the reason in the first case of Dr Brewis, where a small fibroid was found in the wall of the womb. The shock on the second day of that case may have been due to the antiseptic irrigations, because all the symptoms resembled a temporary carbolic poisoning. As for the method of removing the uterus, it seemed to be better to tie the broad ligaments instead of using the clamps, and after removal of the uterus to pull the stumps into the vagina and to close the wound of the operation by suture, though also in Germany opinions varied as to the procedure.

Dr Berry Hart congratulated Dr Brewis on his success.

Dr Brewis thanked the Society for their kind reception of his paper. The sections proved the first case to have originated in an adenoma. He would stitch the vaginal roof if he were sure that the peritoneal cavity was clean. In both of his successful cases the vaginal roof had been left open.

IV. CASE OF CONGENITAL OBLITERATION OF THE SMALL INTESTINE.

By JOHN THOMSON, M.D., F.R.C.P.Ed., Extra-Physician to the Royal Hospital for Sick Children; Lecturer on Diseases of Children, School of Medicine, Edinburgh.

MRS G.'s infant (male), two and a half days old, seen on 12th Nov. 1890, on account of complete obstruction and constant vomiting, along with my friend Dr Home Ross, to whose kindness I am indebted for permission to publish the case.

Family History.—Father and mother healthy; no syphilis. The mother has had four pregnancies. The first child is alive, but is strumous; the second was still-born (full-time, cross-birth); the third pregnancy ended in a miscarriage at the fifth month, owing to the presence of an ovarian tumour. The patient is the fourth child.

Pregnancy.—When the mother was about two months pregnant [1] she had a left ovarian cyst removed by laparotomy. The operation was not a complicated one. Shortly after it, she had a threatening of miscarriage which was successfully treated by large doses of morphia. After that, everything went well till the full term.

Birth (*10th November*, 3 A.M.) easy and natural. There was an extremely large quantity of liquor amnii, and an unusually thick layer of vernix caseosa, both said to be of perfectly normal colour. The child's extremities were noticed to be very blue, and his body of a brighter red colour than usual.

Since birth he has vomited everything given to him (milk and water, and four doses of castor-oil). No motion of any kind has come from the bowel. The skin has gradually assumed a distinctly yellow tinge.

Present Condition.—The child is well developed and of natural size. The skin is bright red, with a strong orange tint. The conjunctivæ are only slightly yellow. The lips, the vertex of the scalp, the palms and soles, and the neighbourhood of the anus, are all markedly cyanosed, and there is a bluish tinge over some other parts of the body. The tongue and gums, however, are quite free from this. The child cries constantly, as if from hunger. No

[1] The last menstruation began on 4th March; the operation took place on 23rd May.

external malformation. The thorax is well shaped, but there is considerable indrawing of the episternal and epigastric regions with each inspiration. The percussion-note over the bases of the lungs is not very clear. The examination of the heart reveals no abnormality.

Abdomen not distended, but its walls are very tense. On percussion a tympanitic note is got over the region of the stomach, but over all the lower part of the belly the note is absolutely dull. The liver and spleen cannot be felt. The anus seems small, but admits the little finger without much difficulty, and is felt to contain a few soft rounded masses. These, when removed by an enema, are found to amount to rather more than a teaspoonful in bulk. The matter is absolutely without odour and of a whitish colour, with no tinge of green or yellow. It consists of rounded agglomerations of little many-sided bodies, from the size of a lentil to that of a split pea; these have an ivory-white colour on section, and the consistence of lightly-boiled white of egg, and they are held together by thick white mucus. There is also a little pasty amorphous matter. (The contents of the rectum were put into spirit and afterwards examined microscopically. They seemed to be composed of epithelial débris.) When the rectum is cleared, the little finger can with some difficulty be passed up nearly 2½ inches, and there is no obstruction. The vomited matter is greenish-yellow in colour. The urine passes freely. At first it is said to have been clear and not to have stained the clothes; now it is thick and dark, and stains them yellow. On the prepuce and on the napkin there is a large quantity of "brick-dust" deposit.

Treatment.—In addition to the enema, several injections of glycerine were given.

Progress (*November* 15*th*).—Child more deeply jaundiced. Continues to vomit everything. Has passed nothing by the bowel but a few drops of colourless fluid.

November 19*th*.—Has not vomited at all for two days, although taking a little sugar and water. One very small colourless motion. Urine dark, staining the napkins yellow. Child becoming extremely emaciated. Cyanotic tinge almost gone. On removing the napkin the child is found to have passed about half a teaspoonful of dark-green matter, homogeneous and slimy. The shade of colour is not so dark as that of ordinary meconium, and is a good deal yellower.

This was submitted to Dr Noël Paton, who kindly examined it, and reports:—

"Specimen consisted of several very small, irregular masses with a greenish-yellow colour, some parts distinctly green, other parts yellow. The pigment is insoluble in alcohol, chloroform, or ether. On treatment with alcohol and sulphuric acid, the yellow pigment goes into solution; the green pigment does not. The

solid masses of green pigment, when treated with nitroso-nitric acid, give a faint but distinct play of colours.

"In their solubility these pigments differ from the bile-pigments, but they give Gmelin's test. Possibly they may consist of bile-pigments which have been for a long period in the bowel and have undergone some change. But it is also possible that they may be pigments produced in some other way. The specimens were so small that it was not possible to make an extended investigation."

Under the microscope, the specimen was found full of micrococci.

Nov. 20th.—The child died at 7 A.M., aged ten days and four hours.

Post-mortem Examination.—Body extremely emaciated; skin slightly but distinctly jaundiced; no obvious cyanosis. Rigor mortis considerable. Dark-green discoloration over the left side of the abdomen.

On opening the abdomen, a large tumour of a purplish-red colour is found to occupy the greater part of the left half of its cavity. This is found to be the distended portion of gut just above the seat of the obliteration. The rest of the bowel is found to be contracted to its fullest extent, and is of a pale yellowish colour. The surface of the peritoneum is smooth and glistening, and, with the exception of the narrow band to be afterwards described, no sign of peritonitis, either old or recent, can be found.

The liver is somewhat large, and very dark and congested, but otherwise normal to the naked eye.

The gall-bladder is normal in appearance, and is filled with dark bile. The cystic duct seems normal and permeable, but is unusually long. The hepatic and common ducts are also pervious and apparently normal.

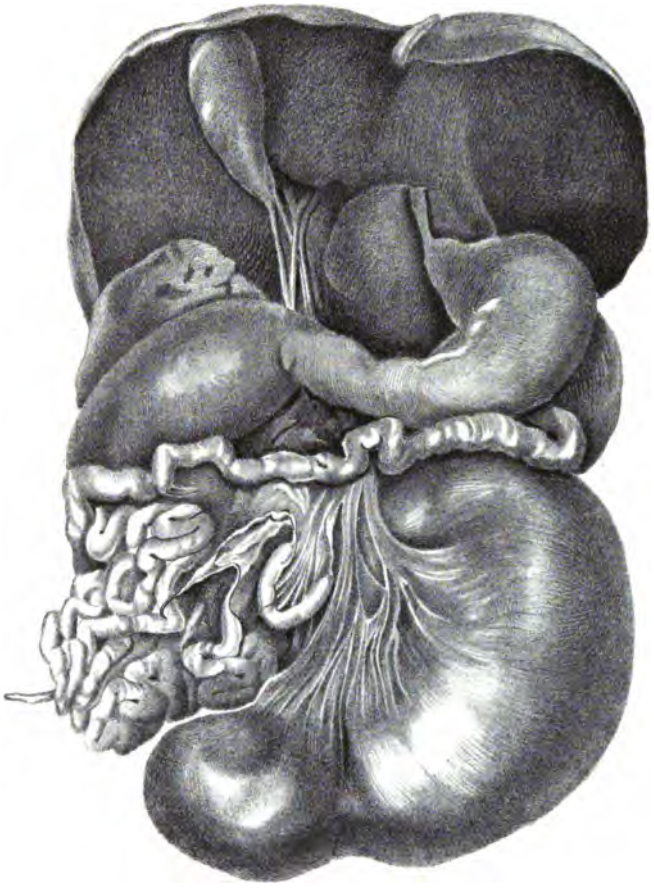
The pancreas, spleen, and mesenteric glands seem normal.

The kidneys are congested, showing extremely copious uric acid infarcts in the pyramids.

The *œsophagus* and *stomach* are normal.

Intestines (see Plate).—At the very commencement of the duodenum, the gut becomes enormously dilated. The dilated portion measures 10 inches in length, and from 1 to 1½ inches in diameter, and is of a dark purplish-brown colour. It comprises the whole of the duodenum, and probably also a few inches of the jejunum. Its lower extremity is an abruptly rounded end; it is perfectly closed, and there is a gap between it and the next portion of bowel. The mesentery belonging to it also comes to an abrupt end, there being a deep fissure between it and that of the succeeding piece of intestine. The bloodvessels in the mesentery are very unusually large. When the distended duodenum is opened, it is found to be full of turbid yellowish-brown fluid—evidently the food swallowed mixed with bile and other secretions.

A short distance from this dilated portion of bowel is a small



Congenital Obliteration of the Small Intestine ·

WM CATHIE LITH

bit of gut, 1¼ inch in length and ⅛ inch in diameter. It is blind at both ends (which are rounded), and is fixed in the shape of a horse-shoe by a little tongue-like flap of mesentery.

When the mesentery is followed to the right, its free margin is found to be thickened in places by what appear to be fragmentary remains of obliterated bowel, and it is prolonged into a peaked flap lying horizontally (see Plate). From the point of this flap a small, rounded, fibrous band passes in among the neighbouring coils of intestine; and, after encircling the mesenteric attachment of a large portion of the bowel, is fixed by a fan-shaped end into the middle of the upper surface of the mesentery of a coil of jejunum, about 7 or 8 inches below the lowest point of obliteration. This fibrous band is 1 inch in length, it is very dense in texture, and resembles fine silkworm gut in size and appearance.

The small intestine becomes pervious again about 2½ inches below the horse-shoe shaped fragment. During the rest of its course it varies in diameter from ⅛ to ⅛ inch. In one or two situations the lumen is seen to be occupied by small masses of green matter; elsewhere it seems quite empty.

The large intestine is similarly contracted, measuring only about ¼ inch in diameter, and is in a similarly empty state.

Thorax.—The lungs show a little collapse at both bases, but are otherwise normal. Thymus of medium size; pleuræ and pericardium normal; heart normal, all the valves healthy and the septa complete, with the exception of a small valvular opening in the fossa ovalis (posteriorly); ductus arteriosus patent, admitting a probe the size of a No. 1 catheter.

Remarks.—The main points of interest in this case seem to be—(1) the nature of the green fæcal matter passed on the tenth day, and (2) the pathology and etiology of the obliteration of the bowel.

1. *The Nature of the Green Fœcal Matter.*—As we see from Dr Noël Paton's report, the analysis which was possible of the small quantity submitted to him did not settle this question. The fact of a faint play of colours with nitroso-nitric acid being observed is the only point in favour of the green colour being due to bile-pigment. On the other hand, the other reactions were quite different from those of ordinary meconium.[1] Dr Paton suggests that possibly the length of time the matter had been in the bowel might account for these differences, but it cannot have been any longer there than ordinary meconium usually is.

We get more light, however, from the clinical facts. The main *bulk* of normal meconium is made up of matters derived from the vernix caseosa which the infant has swallowed *in utero* along with liquor amnii. In this case these matters would be arrested by the obliteration. This accounts for there being, at birth, not more

[1] Zweifel, *Arch. f. Gynæcol.*, vii. p. 474, 1875.

than 2½ drachms of fæcal matter in the lower stretches of this child's bowel, instead of about 2½ oz., as is normally the case.

In a normal new-born child's bowel, the nearer the anus the darker is the colour of the contents. Consequently the first motions are the darkest of all, and those passed later become gradually paler, until about the third day they have acquired the characteristics of ordinary fæces.

In this child, the first two motions were absolutely devoid of any green or yellow tinge; indeed, no coloured motion was passed till the tenth day, after numerous enemata. Were the green colour of the last motion due to bile-pigment which had passed through the intestine before its lumen was interfered with, how could the motions passed during the first ten days possibly have escaped colouring?

The above facts seem sufficient to prove that the green colour was not caused by bile-pigment; and we are therefore forced to the conclusion that the micro-organisms contained in the discharge must be held responsible for it.

2. *Pathology and Etiology of the Lesion of the Bowel.*—There can be little doubt that the obliteration of the lumen of the bowel in this case was secondary to, and caused by the action of the narrow fibrous band described above.

It seems a recognised fact that such bands are the remains of peritonitic adhesions, the shape of which has been altered by prolonged traction.[1] We must therefore suppose that at some (probably early) period of intra-uterine life there had existed a patch of peritonitis, which caused adhesion of a coil of jejunum to a neighbouring piece of mesentery, and that, as the intervening gut elongated in the process of development, these parts were pulled asunder. In this way elongation of the adhesion occurred and kinking, followed by eventual obliteration and partial disappearance of the implicated bowel. As to the isolated horse-shoe-shaped fragment, its form and that of its mesentery suggest the probability that it is the remains of a volvulus or of a loop of gut which had at one time been caught and constricted by the fibrous band.

The question naturally arises—Had the ovariotomy anything to do with causing this peritonitis? On *à priori* grounds, and looking at the probable date of the occurrence of the latter, it would seem quite possible that it may have had. On the other hand, however, ovariotomy is frequently performed during pregnancy, and yet after considerable search I have not been able to find a single case recorded in which any malformation of or injury to the child resulted. I have also asked a number of experienced ovariotomists, and find that none of them have had any experience of a child born soon after an ovariotomy having suffered at all from

[1] Treves, *Intestinal Obstruction*, 1884, p. 5.

the operation. It is therefore quite probable that the occurrence of the peritonitis about the same time as the operation is merely a matter of coincidence.

Dr J. W. Ballantyne had seen a specimen of congenital obliteration of the small intestine very similar to that described so fully by Dr John Thomson. It was found in the case of an infant born in the Maternity Hospital some years ago, when the late Dr Angus Macdonald was physician to that institution, and it was now in Dr Barbour's museum. A note of the specimen would be found in the *Transactions of the Edinburgh Obstetrical Society*, vol. x. p. 229. The stomach was much distended, and at its pyloric end was another dilatation almost as large as the stomach, which was probably the first part of the duodenum. There was no communication between this and the second part of the duodenum, which ended blindly, and with the pancreatic and bile ducts, which were patent, opened. The infant developed jaundice shortly after birth, vomited constantly, and passed neither urine nor meconium. It died on the sixth day. With regard to the appearance of coloured stools in Dr Thomson's case, Dr Ballantyne thought the explanation that the colour was due to microbes and not to bile was the only feasible one. In the intestine at birth there were no bacilli, but very soon afterwards these entered per anum, and it was conceivable that they might have given the colour to the subsequent stools, although the first were clay-like.

V. STUDIES IN FŒTAL PATHOLOGY AND TERATOLOGY.

II. Clinical Notes of Four Cases, and Description of Two Specimens of General Dropsy of the Fœtus.

By J. W. Ballantyne, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Diseases of Infancy and Childhood, Minto House, and on Midwifery and Diseases of Women, Medical College for Women, Edinburgh; Physician for Diseases of Women and Practical Obstetrics, Western Dispensary, Edinburgh; and Secretary to the Edinburgh Obstetrical Society.

During the last few years four cases of general dropsy of the fœtus have come under my notice; in two of these cases I was fortunate enough to obtain the specimens for dissection, but in the other two I was only able to get their clinical history. Three of the fœtuses were the offspring of the same patient, and the fourth was the child of her sister-in-law. I am indebted to Dr Freeland of Broxburn for the specimens and for the clinical notes of the cases; he has had the patients who gave birth to these diseased infants under his care for several years, and has very kindly supplied me with all the information I required. The first fœtus (Specimen A) was examined by the frozen sectional method for the special purpose of demonstrating the position of the dropsical

fluid and of the organs; drawings of these sections were shown to the Obstetrical Society of Edinburgh in 1887. The second fœtus (Specimen B) was investigated by simple dissection, and the tissues were specially examined with a view to demonstrating their microscopic characters.

Definition of General Dropsy of the Fœtus.—It is impossible to frame a satisfactory definition of this fœtal malady, for the cases which have been recorded by various authors present differences so wide as to suggest that we are here dealing, not with a pathological entity, but with a group of symptoms common to several different morbid conditions. It may, however, for convenience be defined as a rare condition of the fœtus, characterized by general anasarca, by the presence of fluid effusions in the peritoneal, pleural, and pericardial sacs, and usually by œdema of the placenta; and resulting in the death of the fœtus or infant before, during, or immediately after birth. It is to be distinguished from such conditions as ascites or peritonitis of the fœtus, œdema neonatorum, congenital elephantiasis, and fœtal syphilis. I believe that it is also to be differentiated from the condition known as hydrops sanguinolentus fœtus. At the same time, I believe that some of the specimens which have been described by authors as examples of fœtal peritonitis and hydrops sanguinolentus have really been instances of general fœtal dropsy in infants that have died in utero.

Synonyms.—Various names have been given to this group of symptoms. *General dropsy of the fœtus* is perhaps that most commonly used: the "*hydropisie généralisée du fœtus*" of the French writers, and the "*Haut und allgemeine Wassersucht*" of the German authors. It has also been called *general fœtal œdema, fœtal ascites and anasarca, dropsy and gelatinous anasarca of the fœtus, serous effusions in the fœtus,* and *universal dropsy of the fœtus* (hydrops universalis fœtus).

Historical Note.—The literature of the subject will be detailed in a later part of this paper; but a *résumé* of the history of the disease may here be given. It has been supposed by some that Hippocrates was speaking of a case when he described the birth of a fleshy fœtus (fœtus carnosus); but it was not till the seventeenth century was reached that records of undoubted cases appeared. They were those of Louyse Bourgeois, Plater, Severin, Seeger, and Dorstenius. In the eighteenth century the condition was discussed by Duettel and by Lavaterus; Lospichlerus and De la Motte each described a case; Schurig noted one case of his own, and gathered together those related by other authors; and Bianchi of Venice described it in a case of triplets. In the early part of the present century F. B. Osiander, Carus, Lamouroux, Billard, Seulen, and Hufeland reported cases; Graetzer and Hohl of Halle described the disease in their interesting works on fœtal maladies; and Cruveilhier gave notes of two cases which occurred at the Paris

Maternity. Among the cases of fœtal peritonitis recorded by Sir J. Y. Simpson were one or two which were possibly examples of general fœtal dropsy; and this remark applies also to West's cases, and to some of those described by other authors (*e.g.*, Pollnow) under the name of hydrops sanguinolentus fœtus. During the last forty years there have been several important contributions to the literature of this subject: cases were described by Weber, Ferris, Keiller, Thomas, Tamm, Goldmann, Walker, Clay, Burton, Betschler, and Ritter between the years 1850 and 1870, and of these the two cases fully detailed by Betschler were perhaps the most valuable; Joulin and Herrgott considered the condition among the causes of delayed labour; in the years 1875-7 appeared a series of cases in the London Obstetrical Society's *Transactions*, narrated by Protheroe Smith, Lawson Tait, Snow Beck, and John Bassett; Schütz, Klebs, Spiegelberg, Jackesch, Strauch, Braun, Habit, Nieberding, Ahlfeld, Behm, Ruge, Hönck, Sänger, Küstner, Lohlein, Cohn, and Fuhr have written upon it in Germany; Angus Macdonald and A. R. Simpson showed specimens of it to the Edinburgh Obstetrical Society, and I exhibited to the same Society the sections of my first case in the year 1887; Chiara, Pinzani, and Raineri have contributed cases from Italy; and Taruffi of Bologna has discussed the condition in his large compendium of Teratology; in some recent text-books on Midwifery it has been referred to (*e.g.*, *Tarnier* and *Budin*, *American System of Obstetrics*, etc.); Dareste has thrown some light upon its causation in his teratogenic studies on the hen's egg; and Smith and Birmingham have described a case of it in which the thoracic duct was absent. Longaker, Osler, and Gueniot have also noted cases.

Varieties.—I have, for etiological reasons to be afterwards detailed, divided the cases of general fœtal dropsy into two primary groups, in one of which the disease occurs in the single fœtus, and in the other in one of twins or of triplets. The further subdivision of these groups is, however, necessary, and will be referred to again when we have considered the pathogenesis of the state.

Frequency.—There can be no doubt but that general fœtal dropsy is an extremely rare condition. I have been able to collect together the records of little more than sixty cases. To these must be added the cases of general dropsy in malformed twin-fœtuses which are found scattered throughout medical literature, and in which the dropsical state has not been specially emphasized by the writers; but even these are few in number.

Description of Cases and Specimens.

The first specimen of general fœtal dropsy which came into my hands for examination was kindly given to me by Professor Simpson, to whom it had been sent by Dr Freeland in March 1887. Since that year Dr Freeland's patient has given birth to

two other dropsical fœtuses, and her sister-in-law has given birth to one; of these three specimens one has come into my possession.

Obstetrical and Clinical History of Dr Freeland's Cases.—Mrs A., now 37 years of age, has had an interesting obstetrical history, of which the following are the chief details. Her two first pregnancies resulted in the birth of full-time healthy infants, who are now alive and healthy. Her third, fourth, fifth, sixth, and seventh pregnancies terminated prematurely between the sixth and seventh month; the infants were still-born on all these occasions, but no autopsy was made upon any of them. The eighth pregnancy also came to an end between the sixth and seventh month, and it was noted that the placenta was "extensively diseased." During the ninth gestation the patient was put upon a course of chlorate of potash, in the hope of enabling her to carry to the full term a living child; but between the eighth and ninth months premature labour set in, and a male infant with general dropsy was born. This fœtus (Specimen A) was examined by me by the frozen sectional method. The labour had been easy and rapid, for the woman had been delivered before Dr Freeland arrived at the house. There had been hydramnios in a very marked degree. The infant's heart beat for a few minutes after birth, but there was no attempt at respiration. The placenta was large, pale, and œdematous. The puerperium was quite normal, and there was not, and had not been during pregnancy, any albuminuria. Soon after this a tenth pregnancy occurred, and this resulted in the birth of a full-time dropsical infant that lived about twenty minutes. Dr Freeland was not present at the confinement, and did not see the infant; but he was told by the mother that it was exactly similar to the one above mentioned. "It was," she said, "a fine, well-formed child, but full of water." Her next pregnancy came to an abrupt conclusion at the seventh month; the fœtus was dead, with the skin peeling. The twelfth pregnancy terminated on December 13th, 1891, in the birth of a six months' dropsical fœtus, with a placenta exactly similar to that in the eighth pregnancy. This fœtus is named hereafter Specimen B. Dr Freeland was sent for early in the morning of December 13th, when he found that Mrs A. had had an extensive hæmorrhage, and had all but fainted. Fœtal movements had been felt for two or three weeks previously, and also on the previous evening. The vagina was plugged, as there were no labour pains; six hours later labour set in, and when the plug was removed the os was found to be about the size of a penny. Dr Freeland soon after ruptured the membranes, and a foot (the right) came down; traction on this caused a tearing of the tissues at the ankle. Uterine pains and hæmorrhage now ceased, but recommenced seven hours later. The breech now passed easily through the os, and a female fœtus was soon completely born. There was marked hydramnios. No difficulty was experienced in removing the placenta, but on lifting it by the cord the latter

General Dropsy of Fœtus, Case A ($\frac{2}{5}$ Nat. Size).

Wm CATHIE, DEL ET LITH

broke across. The puerperium was normal. She had last menstruated on June 6th, and her pregnancy, therefore, had advanced as far as the sixth month.

Both the patient and her husband were very anæmic in appearance; but she had always, she said, enjoyed good health. In her pregnancies it was only after quickening had occurred that she began to feel swollen, uncomfortable, and as if there was great pressure about the lower part of the right side of the abdomen. There was no evidence of renal disease. The question of syphilis was carefully inquired into, but absolutely no history or sign of that disease could be found either in the woman or her husband. Further, neither her mother nor her sister had ever had still-born infants or abortions. Dr Freeland, however, accidentally discovered the following curious circumstance:—The patient's brother, who had exactly the same waxy anæmic look, was married to a thoroughly healthy woman. She had been six times pregnant by him, and each gestation had ended in an abortion. Her seventh pregnancy went to the full term, when she was delivered of a still-born dropsical infant. Dr Freeland was so much struck by the resemblance between this child and that of Mrs A. that he remarked upon the circumstance, and then, for the first time, learned that the women were sisters-in-law. Unfortunately this second patient soon after left the district, and her history was not obtainable; but it was heard that she had had an eighth pregnancy, which had also terminated in the birth of a still-born infant, whether dropsical or not is unknown. There were no alcoholic tendencies in Mrs A.'s case, but there were such in that of her sister-in-law.

Morbid Anatomy of Specimen A.

A. *External Appearances.*

In the case of this first specimen, I had a water-colour sketch made of it before placing it in the freezing mixture. This was done in order to bring out the external appearances which it presented at that time (Plate I.) In this sketch the swollen state of the abdomen and the general condition of anasarca are well represented, as are also the œdematous, glossy, and pinkish appearance of the skin all over the body, and the deepening of the grooves at the flexures of the limbs. The œdematous state of the subcutaneous tissue of the forehead and eyelids has reduced the eyes to mere slits, and has caused a deep groove above the root of the nose. The mouth is seen to be partly open, and the tongue protrudes to a slight extent. The great œdema of the hands and feet has given to these parts a swollen, almost deformed appearance. The anasarca, whilst general over the whole body, is seen to be specially well-marked in the regions of the thorax, abdomen, scrotum, and thighs. The umbilical cord

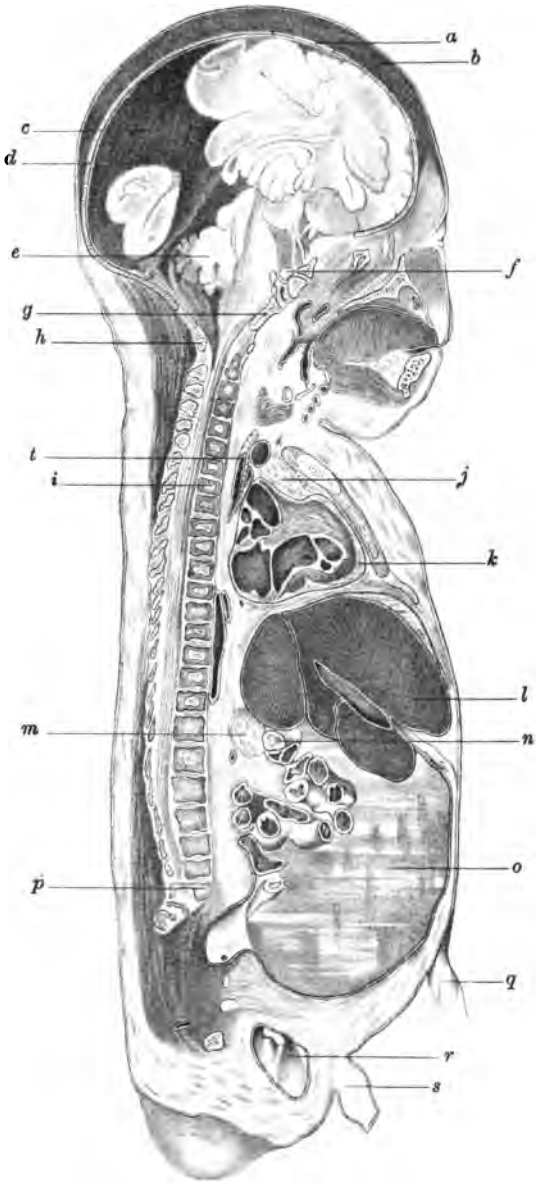
also is swollen and œdematous. The bones and sutures of the cranium could hardly be felt on account of the œdema. The pressure of the finger made the skin to pit all over the body, and the presence of a large quantity of fluid in the abdomen was evident on palpation. There were no bodily deformities, such as talipes, spina bifida, imperforate anus, etc.

The *measurements* of the fœtus were as follow: — The total length from vertex to heel was 17 inches (43 cms.); that from vertex to symphysis pubis was 11 inches (28 cms.) The circumference of the abdomen was 16 inches (40·5 cms.), and was about 3 inches greater than that of the head. The cranial diameters were: Maximum, 4¾ inches (12 cms.); O.M., 4¼ inches (10·8 cms.); O.F., 4 inches (10 cms.); and s.O.B., 4 inches. The transverse measurement in the thoracic region was 4 inches, and the antero-posterior 3⅛ inch (7·8 cms.); in the region of the abdomen the transverse was 5½ inches (14 cms.), and the antero-posterior 3⅝ inches (9·2 cms.)

The Placenta and Membranes.—The placenta had a diameter varying from 7½ to 6¾ inches (19 to 17 cms.) It was rather thick relatively to its size, measuring at some points nearly 2 inches (5 cms.) The point of insertion of the cord was eccentric, being only 2½ inches from one border of the placental mass. The uterine surface of the placenta had a very characteristic pale, anæmic, and gelatinous appearance; and its tissue was very friable, so much so that at the time when the specimen came into my hands the placental lobes were torn in several places. A large quantity of clear, viscid fluid drained away from the placenta into the vessel in which it was kept. Near the margin of the placenta at one spot was a partially decolorized blood-clot about 1 inch in thickness, and having a diameter of about 2 inches. The fœtal surface of the placenta was most evidently anæmic. Its bloodvessels, save at the point of insertion of the cord, were collapsed, and were difficult to trace, for they did not stand out in the usual way as dark lines. The *amnion* was normal in appearance, perhaps a little less transparent than usual; but the *chorion* was distinctly thickened, and on its uterine surface there were very evident traces of decidual remains in the form of reddish patches. The *umbilical cord* measured 20½ inches (52 cms.) in length, and its circumference was about 3½ inches. It was thick but pale, and its bloodvessels were nearly quite empty, the vein alone containing a small quantity of blood-clot. The jelly of Wharton was present in large amount.

B. *Pathological Appearances of the Viscera, etc., in Specimen A.*

I. *Naked-Eye Appearances.*—In this specimen, as has been already said, the sectional method of investigation was employed. The infant was placed in the freezing mixture in the dorsal

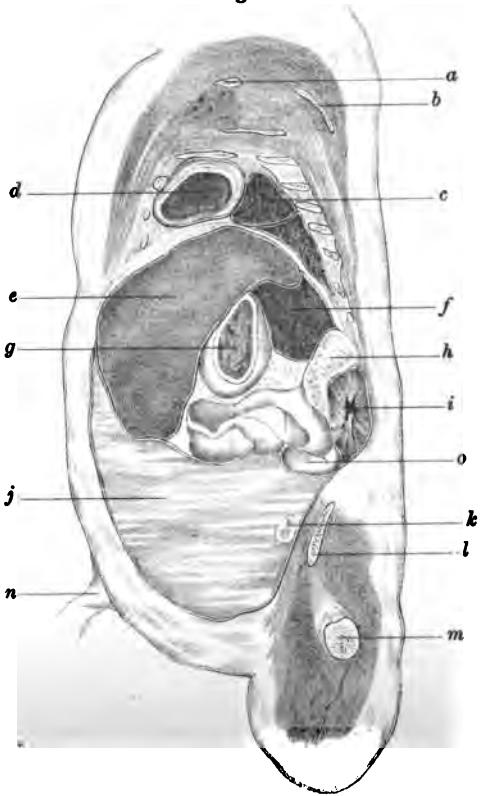


Vertical Mesial Section of Fœtus with General Dropsy ($\frac{1}{2}$ Nat. Size).

W^m CATHIE DEL ET LITH

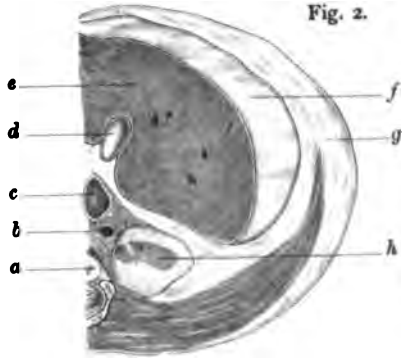
Plate III.

Fig. 1.



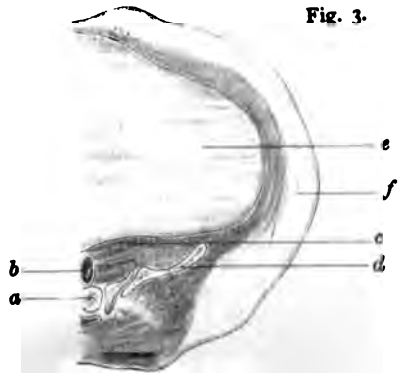
Left Lateral Sagittal Section of
Dropsical Infant, right face shown (¼ Nat. Size).

Fig. 2.



Transverse Section at level of
1st Lumbar Vertebra.

Fig. 3.



Transverse Section at level of
1st Sacral Vertebra.

posture. The thighs were not markedly flexed, but were slightly abducted and rotated outwards, and the head was partially flexed upon the sternum. When the body was frozen, sections were made with the saw in different planes, and the appearances seen were traced and sketched whilst the dropsical fluid was still in a frozen condition. By means of these sections, which were in both the vertical and transverse planes, the salient points in the morbid anatomy were revealed, and the position of the fluid defined in a way that no other method could have achieved.

The following were the sections which were made and drawn:—

a. Vertical sections—

1. Mesial sagittal section of head and trunk, left face. Plate II.
2. Mesial sagittal section of head, right face.
3. Mesial sagittal section of pelvis, right face.
4. Lateral sagittal section of head and trunk, $\frac{3}{4}$ inches to the left side of No. 1, right face shown. Plate III., Fig 1.
5. Lateral sagittal section of head and trunk in same plane, left face shown.

b. Transverse sections—

6. Horizontal section of right half of body at level of 7th cervical vertebra.
7. Horizontal section of right half of body at level of 5th dorsal vertebra.
8. Horizontal section of right half of body at level of 1st lumbar. Plate III., Fig. 2.
9. Horizontal section of right half of body at level of cartilage, between 1st and 2nd sacral vertebræ. Plate III., Fig. 3.

From the study of these sections, and from such further dissection as was necessary, the regional anatomy and pathological appearances of the viscera in this fœtus were determined; but since the space at my command is limited, the results must be described shortly as follows:—

Vertebral Column.—The spinal canal and cord were intact, and normal in size and form; the ossification of the vertebræ was well advanced for the age at which the fœtus had arrived; the upper part of the spine was nearly straight, whilst the lower dorsal region showed a distinct anterior bulging, the lumbar portion a slight concavity anteriorly, and the sacro-coccygeal part had its usual slight anterior concavity; the curves of the spine were due to the position in which the infant had been frozen, and probably also to the ascites. The various regions of the spine bore to each other the usual relationship as regards length which is found in the premature infant; that is to say, the dorsal region was nearly

twice as long as the cervical, whilst the lumbar was practically equal in length to the cervical. The total length of the spine was 16 cms., the cervical region was 3·5 cms., the dorsal 6·5 cms., the lumbar 3·3 cms., and the sacro-coccygeal 2·7 cms.

The Region of the Head.—The tissues of the scalp were markedly infiltrated with blood-stained serum, but there was no special caput succedaneum. There was little head-moulding, and the absence of caput and of head distortion was due no doubt to the easy character of the labour. The bones of the head were well ossified, and there was no undue distension of the cerebral ventricles with fluid; there was, therefore, no sign of hydrocephalus. In the cartilage between the post-sphenoid and basi-occiput there was the trace of a canal, probably the remnant of the canalis cranio-pharyngeus. The inclination of the basis cranii to the horizon was normal; the brain was well formed in all its parts, and its convolutions and fissures bore a normal relation to the sutures of the cranium. There was a blood effusion into the falx cerebri and tentorium cerebelli—a meningeal hæmorrhage probably due to the diseased state of the placenta and fœtus, and not to any special pressure on the head during labour. In the region of the face the only abnormality was the presence of great subcutaneous œdema, especially under the chin. The tongue was partially protruded from the mouth.

The Region of the Neck.—The structures in the neck were normal, save with regard to their position; they were all displaced upwards to some extent. The hyoid bone, which normally lies at the level of the third cervical vertebra, lay opposite to the body of the axis. The larynx, which should extend from the level of the junction between the body and odontoid process of the axis to that of the fifth cervical vertebra, was found in this case to reach from the level of the upper border of the atlas to that of the disc between the third and fourth cervical vertebræ. The trachea was found to bifurcate opposite to the body of the second dorsal vertebra, *i.e.*, one vertebra higher than is normal at birth. The trachea was 3 cms. in length, the normal measurement; the thyroid gland was normal; the thymus gland extended a little higher in the neck than is usual; and the left innominate vein crossed over the trachea at the level of the sixth cervical vertebra. The relatively high position of the structures in the neck was no doubt mainly due to the presence of fluid in the abdomen.

The Region of the Thorax.—The thoracic viscera and the anterior thoracic wall were displaced upwards; the upper margin of the sternum lay at the level of the sixth cervical vertebra; the tip of the ensiform cartilage lay opposite to the body of the sixth dorsal vertebra, and was tilted forwards,—indeed, the whole of the lower half of the sternum was displaced forwards as well as upwards. The distance between the manubrium sterni and the spinal column was 1·5 cms., whilst that between the tip of the ensiform

and the body of the sixth dorsal vertebra was 5 cms. In a normal infant the corresponding measurements were 2·5 and 5·2 cms., and in that case the manubrium lay opposite to the first dorsal vertebra and the tip of the ensiform at the level of the tenth dorsal vertebra. The central tendon of the diaphragm lay opposite to the body of the sixth dorsal vertebra, instead of at the level of the disc between the eighth and ninth dorsal vertebræ, its normal position at birth. All the internal diameters of the thorax were smaller than normal, but they were not proportionately so. The antero-posterior diameter at the level of the manubrium was relatively smaller than that at the level of the ensiform, and this due to the tilting forwards of the sternum in its lower half. These two diameters were 1·5 and 4 cms. as compared with 2·5 and 4·5 cms. in the normal infant. The ribs lay more generally transversely than they usually do, for the whole thorax was elevated. The thymus gland appeared to be normal in form and size; it was a little higher in the neck than is normal. A clear yellow-coloured fluid was found in the pericardial sac, lying anterior to and below the heart. The position of the pericardial effusion was due to the way in which the fœtus was placed during freezing. The heart corresponded in level to the first six dorsal vertebræ, instead of to the fourth, fifth, sixth, seventh, and eighth dorsal bodies, which is its usual position; it was therefore much displaced upwards. The valves and orifices of the heart were normal so far as could be judged, but the section had unfortunately passed through the foramen ovale. The ductus arteriosus was largely patent; the cardiac walls were, however, more anæmic in appearance than is usual. The lungs were unexpanded, lay posteriorly and laterally to the heart, and were surrounded by blood-stained pleural effusion. The apex of the right lung lay at the level of the sixth cervical vertebra, and its base extended no lower than the seventh dorsal; the left lung had very similar relationships. The trachea and œsophagus were normal, save for their relatively high position; and the thoracic duct was present.

The Region of the Abdomen.—The most remarkable pathological condition in this fœtus was the presence in the abdomen of a large quantity of transparent fluid of a light yellow colour, and containing no flakes of lymph; it occupied nearly the whole of the lower and anterior parts of the peritoneal cavity, and had evidently displaced the viscera upwards and backwards, and bulged the anterior abdominal wall forwards. The umbilical cord was attached at a point 2 cms. above the symphysis pubis and 9 cms. below the tip of the ensiform cartilage, and lay opposite to the body of the first sacral vertebra, being about one vertebral body lower than in the healthy infant. The umbilical arteries and veins and the urachus were normal. The liver, which was paler in colour than normal, and had like all the other viscera an anæmic appearance, was tilted upwards and forwards, especially in its anterior less fixed part.

In vertical extent in the middle line the liver corresponded to the six lower dorsal vertebræ and to the first lumbar vertebra, instead of to the four lower dorsal and two first lumbar vertebræ, as in the normal infant. The whole liver was also rotated somewhat to the left side, and ascitic fluid intervened between the right and anterior hepatic surfaces and the anterior abdominal wall. The anterior surface of the liver was directed forwards and upwards instead of forwards only, and the left inferior surface looked less directly backwards and more in a downward direction than is normal. The gall-bladder contained some bile. The pyloric end of the stomach crossed the middle line at the level of the body of the twelfth dorsal vertebra, and was therefore one vertebra higher than is normal. The stomach contents were of a greenish colour and partly fluid; the organ lay entirely under cover of the left hepatic lobe. The spleen was somewhat enlarged; its greatest vertical measurement was 3 cms., and its greatest antero-posterior 3·3 cms. Its form, as seen on vertical section, was more quadrangular than is normal. The splenic enlargement was chiefly in the antero-posterior direction, but this increase was not altogether real; it was partly due to the displacement upwards of the lower end. The pancreas appeared normal in size and form, but was much infiltrated with fluid. Lying near the posterior abdominal wall, and under the left hepatic surface, were the closely packed together coils of the small intestine. Very little meconium was present in the bowel, and the coils were not glued together by lymph. The transverse colon was displaced backwards; the cæcum lay above its usual position on the right side; but the descending colon and sigmoid flexure pursued their usual course on the left side. The large intestine had a smaller calibre than is usual, and contained little or no meconium. The third part of the duodenum crossed the middle line at the level of the first lumbar vertebra. The supra-renal capsules were normal in size, but were anæmic in appearance. The kidneys were normal in position, but were slightly smaller than is the rule, and were not distinctly so lobulated as is usual at birth; they were also paler in colour than is usual. The mesenteric glands were present, and did not seem to be abnormally large.

The Region of the Pelvis.—The external genital organs were markedly œdematous; indeed, so great was the surrounding anasarca that the scrotum was embedded in it, and did not hang free, as it normally does. The tunica vaginalis testis on both sides contained a quantity of serous fluid, and the urethra was not occluded. The bony pelvis had its natural fœtal form. The bladder had an oval shape, the long axis of the oval passing upwards and forwards; it contained about 5 c. cms. of clear urine, which gave an indication of the presence of albumen when tested with alcohol. The rectum was collapsed, and contained little meconium; it was normal in form and position. A clear fluid was

found in the pelvic cavity, both laterally and also in the middle line in the recto-vesical pouch.

The Limbs.—Save for the state of gelatinous anasarca of the subcutaneous tissue, and the anæmic appearance of the muscles, the limbs were normal.

II. *Microscopic Characters.*—In the case of this specimen the microscopic examination of the tissues was somewhat unsatisfactory, for the freezing of the infant had to some extent altered the characters of the parts; still, by comparing these appearances with those in healthy frozen infants, it was possible to some degree to correct this source of error, and to state what were the histological peculiarities of the viscera and skin.

A thin layer of epidermic cells was present, and underneath this both cutis vera and subcutaneous tissue had an opened-out appearance. There were fewer fat cells than usual, and both the subcutaneous and muscular tissue had a loose and spongy appearance. The sections of the liver which were examined gave somewhat unsatisfactory results, for the tissue had evidently been altered both by freezing and by early post-mortem changes. The liver cells were imperfectly formed, and amongst them were many nucleated white cells; and whilst these latter were not, I think, so numerous as to constitute a lymphomatous state of the liver, still I have not seen so many leucocytes in the liver of a normal full-time infant. The same remarks apply to the microscopic examination of the spleen. The lungs, the intestines, mesentery, and the supra-renal capsules were, so far as could be made out, normal in structure, although there was a general anæmic appearance to be noted in them as in the other viscera. The kidneys also were, save for their bloodless condition, fairly normal. There were not, perhaps, so many uric acid infarcts as are present at the time of birth; and, in the opinion of one pathologist to whom I showed the sections, there was an abnormally large amount of connective tissue in the left kidney, but I do not think that this slight deviation from the normal could be supposed to be the cause of the general œdema. No pathological changes were detected in the umbilical cord or its vessels, save the unusually large amount of œdematous jelly of Wharton.

Morbid Anatomy of Specimen B.

A. *External Appearances.*

As in the case of Specimen A, a water-colour sketch was made of this, the third dropsical fœtus to which Mrs A. gave birth. In its external appearances it was, save in the matter of size and sex, an almost exact copy of Specimen A. There was the same anasarcous state of the integuments, the same swollen condition of the abdomen, and the same deepening of the normal grooves on

the limbs and lines on the face. The skin had nearly everywhere a pinkish hue, but in some places it was pale yellow in colour. There was pitting on pressure all over the body, but this was specially marked on the head and legs. The right foot was seen to have been partly torn from the leg at the ankle,—a fact which demonstrated the friability of the tissues, for no great traction had been made upon the presenting part. The breech and right leg were more congested in appearance than the rest of the body, and this was accounted for by the circumstance that the presentation had been pelvic. The left labium minus was much swollen and congested.

The fœtus was a female, and weighed 1·3 kilogr. With the exception of the general œdema, there were no external malformations or deformities.

The *measurements* were as follows:—The total length was 35 cms., whilst from vertex to symphysis pubis it measured 23 cms. The head measured 28 cms. in the O.M. circumference, 26 cms. in the O.F., and 25 cms. in the s.O.B. The cranial diameters were—O.M., 10 cms.; O.F., 9 cms.; s.O.B., 8·5 cms.; Bi-P., 7 cms.; and Bi-T., 6·5 cms. The circumference of the thorax was 24·5 cms., and that of the abdomen 26·2 cms., whilst the transverse diameter of the former was 8·2 cms. and of the latter 10 cms. The circumference of the upper arm was 7·5 cms., of the forearm 5·8 cms., of the thigh 10·5 cms., and of the leg 8 cms. The two sides of the body were equally swollen from the œdema.

The Placenta and Membranes.—The placenta was strikingly similar to that in Case A. It had a very blanched appearance, quite unlike the normal afterbirth. The maternal surface was much broken up into lobules, and had a flocculent appearance. Threads of tissue were seen crossing over the sulci between the lobules. At one end of the placenta, not far from the aperture in the membranes, were two large hæmorrhages: one was about 3·5 cms. and the other about 4·2 cms. in thickness. These did not greatly resemble the usual placental hæmorrhagic infarcts, but it seemed rather as if the tissues were here bathed in blood and stained with it. These hæmorrhages had no doubt given rise to the bleeding during labour. The fœtal aspect of the placenta was also anæmic in appearance, and had a pale pinkish colour. The circumference of the placenta measured 53 cms.; it was not circular in outline, but had a length of 20 cms. and a breadth of 13 cms. At its thickest part it measured 4 cms. The umbilical cord was swollen, and had a more distinctly yellow colour than is normal. It was inserted eccentrically, being 4·2 cms. from the nearer, and 8 cms. from the more distant margin of the placenta. It was not near the hæmorrhagic part of the mass. The *membranes* seemed less transparent than usual, and on the outer surface of the chorion were numerous decidual fragments and pieces of blood-clot.

B. *Pathological Appearances of the Viscera, etc.*

I. *Naked-eye Appearances.*—The characters of the regions of the body and of the viscera may be described in the same order as in Case A. Since the differences between the appearances of the organs in Cases A and B are very slight, it will not be necessary to enter into full details in this instance.

Vertebral Column.—The spinal column and the contents of the canal were normal; there was no spina bifida, and no distension of the canal of the cord. The ossification was well advanced for the age of intra-uterine life. The spinal column measured 17 cms. in length. The promontory of the sacrum was faintly marked.

The Region of the Head.—There was well-marked gelatinous anasarca of the tissue lying between the scalp and pericranium, but there was no separation of the latter from the bone. The anterior fontanelle measured 3·4 cms. antero-posteriorly and 2·4 cms. in a transverse direction. The ossification of the bones of both the vault and base of the cranium was normal. The membranes of the brain were anæmic, but not otherwise pathological in appearance. The brain also was markedly anæmic. The cerebral convolutions and fissures were normal for the period of development arrived at; there was no distension of the ventricles; and the cranial nerves were regular in position and of the usual number. There was a small recent hæmorrhage on the under surface of the right temporo-sphenoidal lobe and in the tentorium cerebelli. The pituitary body was normal.

The Region of the Neck.—The parts in the cervical region (the larynx, pharynx, trachea, œsophagus, and thyroid gland) were well developed and normal in appearance, but were displaced slightly upwards.

The Region of the Thorax.—The thymus gland, which was paler in colour than usual, had a vertical measurement of 1·5 cms., a transverse of 1·8 cms., and an antero-posterior of ·8 cm. It was normal in form. The pericardial sac contained about 2 cubic cms. of a pale yellowish fluid. The heart had a vertical measurement of 3·2 cms., a transverse of 2·5 cms., and an antero-posterior of 1·8 cms. The chambers and orifices were normal, save that the foramen ovale was slightly less patent than is usual. The membrane seemed at first sight to close the aperture, but closer investigation showed that the closure was only apparent, and that there was really a free means of communication between the two auricles. The ductus arteriosus was patent. The cardiac muscular walls were anæmic in appearance. In the right pleural cavity were 10 cubic cms., and in the left there were about 2 cubic cms. of straw-coloured fluid. The lungs were markedly pale in colour. The greatest vertical measurement of the right lung was 4·5 cms., and that of the left was 4 cms. There was no abnormality in the form of these organs. The bloodvessels of the thorax were normal, and the thoracic duct

was present in its usual position. There was one ossific centre in the sternum, and that was in the manubrium.

The Region of the Abdomen.—Before the abdominal cavity was cut open the fluid contents were drawn off for examination. The peritoneal sac contained 150 cubic cms. of a yellowish-brown fluid, slightly darker in colour than that in the pleural and pericardial cavities. In this fluid the total proteids amounted to 0·087 (a very small proportion), and consisted chiefly of serum albumen, with a small amount of globulin. The fluid gave the colour reactions of bile-pigment, and on separation with plumbic acetate and rectified spirit gave with sulphuric acid a bright green pigment—biliverdin. Microscopically the fluid was found to contain endothelial cells and acicular crystals of bilirubin grouped together in stars. Dr Noël Paton was kind enough to examine the fluid for me.

When the abdomen was opened it was seen that the intestinal coils lay well above the brim of the pelvis, the cæcum and ascending colon lying at a higher level than is usual. On the left side, however, the descending colon was seen passing downwards and forming a sharp bend with the large sigmoid flexure, which lay across the pelvic brim and became continuous with the rectum. Such was the position of the intestines, that on opening the abdomen the posterior abdominal wall was visible in its lower part, and the uterus, ovaries, and tubes could be clearly seen. In this instance, as in Case A., the bowels had evidently been displaced upwards and backwards, and the peritoneal fluid had occupied the lower and anterior part of the cavity.

The stomach measured 4·5 cms. in length, and contained a few drops of a pale green-coloured stringy mucus. The whole intestine measured a little over 150 cms. in length, and the colon and rectum were greatly distended with the dark green-coloured meconium. The small intestines were somewhat narrow in calibre, and contained little meconium; they had no great range of movement, not on account of any peritonitic adhesions, but from the small size of the mesentery. The vermiform appendix measured 2·5 cms. in length, and was normal in appearance. The liver was normal in form, and had the following dimensions:—Maximum transverse, 8·7 cms.; max. vertical, 5·7 cms.; and max. antero-posterior diameter, 3·8 cms. The hepatic tissue was paler in appearance than is normal. The spleen had its natural form, and measured 4·4 cms. vertically, 2·4 cms. antero-posteriorly, and 1·6 cms. transversely. It also had a somewhat pale and anæmic appearance, being less deeply purple than is usual. The kidneys were normal in position and form, and each measured 2·5 cms. vertically, 2 cms. transversely, and 1·3 cm. antero-posteriorly; they were very pale in colour. The supra-renal capsules were in their natural fœtal position, and each measured 2·2 cms. vertically, 2·1 cms. transversely at the base, and 1·2 cm. antero-posteriorly. The pancreas was pale, but seemed otherwise normal. The bladder

was empty; the hypogastric arteries and urachus were normal; but the ureters seemed slightly expanded in their calibre.

The Region of the Pelvis.—The external genital organs, especially the labia majora, were markedly œdematous; but the uterus, ovaries, and tubes had their normal fœtal characters.

The Extremities.—Save for the œdema of the subcutaneous tissue and the anæmic appearance of the muscles, the limbs were normal. The ossification was as far advanced as was to be expected at this age of fœtal life. There were no indications of syphilitic changes in the long bones, and there was no ossific nucleus in the lower end of the femur.

II. *Microscopic Appearances.*—The tissues were prepared for microscopic examination in two ways: the harder organs were cut in the freezing microtome, and the softer parts—placenta, spleen, thymus, etc.—were embedded in paraffin, and then cut and mounted. They were compared with similarly prepared organs from a normal fœtus that died during labour.

The Skin.—Under the microscope it was seen that the network of the subcutaneous tissue had an opened-out appearance. The papillæ of the derma were not yet well marked. Many hair follicles and sebaceous glands in process of development were visible. A few non-sinuous sweat ducts were to be seen, and on the skin surface was the vernix caseosa. In the subcutaneous layer were many lymphoid cells, and these probably represented an early stage of the connective-tissue formation. The lobules of subcutaneous adipose tissue were not so numerous as in the skin of the full-time infant, but they were not abnormally few in number for the stage of fœtal life arrived at in this case.

The Muscles.—The striation of the muscle fibres was well marked. There were not many red blood corpuscles in the vessels between the muscle bundles, but an unusually large number of white cells was present.

The Lungs.—Only here and there in the pulmonary tissue was a partially expanded alveolus; by far the greater part of the lung was atelectatic.

The *heart-muscle* and *thymus* gland revealed nothing abnormal in their structure, save a general anæmic state.

The Liver.—The lobular arrangement of hepatic cells round the central vein was masked by the presence of a very large number of white cells, which lay between the lobules and between the rows of liver cells. The bloodvessels had somewhat thinner walls than usual. The liver cells were not so regularly polygonal as usual. The capsule was normal. The organ was anæmic.

The Spleen.—There appeared to be no increase in the trabecular framework of the spleen, but there were great numbers of nucleated white corpuscles everywhere present. Red corpuscles in process of formation were also present, but in comparatively small amount.

The Kidneys.—There was marked anæmia of the renal tissue, but the glomeruli and tubules appeared normal. The supra-renal capsules were anæmic, but otherwise normal.

The Placenta.—The most marked changes in the placental structure were found in the villi, which were much larger than is usual in a six months' placenta. The increase in size seemed to be due chiefly to œdema, but in many of the villi there was also a greater amount of connective tissue than is normal. The epithelium covering the villi seemed normal,—perhaps slightly œdematous. The bloodvessels had a healthy appearance, but there were evident signs of anæmia throughout the whole placental tissue. The blood-vessels of the umbilical cord were normal.

Specimen A was investigated in the Obstetrical Department of the University of Edinburgh, while the dissection and micro-scopical examination of Specimen B were carried out in the Laboratory of the Royal College of Physicians, Edinburgh.

Description of Plates.

Plate I.—External Appearances of Fœtus with General Dropsy. Specimen A. ($\frac{1}{3}$ natural size).

Plate II.—Vertical Mesial Section of Fœtus with General Dropsy, left face shown. ($\frac{1}{2}$ natural size.)

a, Anterior fontanelle; *b*, Œdematous scalp tissue; *c*, Hæmorrhage in falx cerebri; *d*, Posterior fontanelle; *e*, Cerebellum; *f*, Pituitary body; *g*, Basi-occiput; *h*, Posterior arch of atlas; *i*, First dorsal vertebra; *j*, Thymus gland; *k*, Fluid in pericardium; *l*, Liver; *m*, Pancreas; *n*, Pylorus; *o*, Fluid in peritoneum; *p*, First sacral vertebra; *q*, Umbilical cord; *r*, Tunica vaginalis testis; *s*, Penis; *t*, Trachea.

Plate III.—Fig. 1. Left lateral sagittal Section of Fœtus with General Dropsy, right face shown. ($\frac{1}{2}$ natural size.) *a*, Clavicle; *b*, Scapula; *c*, Left lung; *d*, Heart, left ventricle; *e*, Liver; *f*, Spleen; *g*, Stomach; *h*, Left supra-renal capsule; *i*, Left kidney; *j*, Fluid in peritoneum; *k*, Sigmoid flexure; *l*, Ilium; *m*, Head of left femur; *n*, Umbilical cord; *o*, Intestine.

Fig. 2. Transverse Section at level of first Lumbar Vertebra. ($\frac{1}{2}$ natural size.) *a*, First lumbar vertebra; *b*, Vena cava inferior; *c*, Duodenum; *d*, Gall bladder; *e*, Liver; *f*, Fluid in abdomen; *g*, Œdematous tissue of abdominal wall; *h*, Right kidney.

Fig. 3. Transverse Section at level of first Sacral Vertebra. ($\frac{1}{2}$ natural size.) *a*, First sacral vertebra; *b*, Rectum; *c*, Ureter; *d*, Ileum; *e*, Abdominal fluid; *f*, Œdematous tissue.

III. General Dropsy of the Fœtus.

In the preceding pages the pathological anatomy, naked-eye and microscopic, of two specimens of general dropsy of the fœtus has been described, and clinical notes of these and of two other cases have been given. It is now necessary, before drawing any conclusions as to the origin and cause of this disease, to group together the results obtained by the various writers who have investigated this subject. Some sixty-five specimens have been

described by about fifty-eight observers, whose names, together with the titles of their papers, will be found at the end of this communication. In only a few cases have I been unable to consult the record in the original. In order to economize space the individual cases will be referred to by number. General dropsy as it occurs in the single, not in the twin, fœtus, is now under consideration.

Clinical History.

An analysis of the clinical details in the recorded cases brings out some interesting facts, but it must be borne in mind when estimating the value of these that in many instances such details were incomplete and in some entirely wanting. Among the questions in the clinical history which were specially investigated were the previous general and obstetrical history of the mother, and her state during the pregnancy and labour which terminated in the birth of a dropsical infant, the general history of the father, and any incidents in the family history which appeared to be of value.

A. *Age of Mother.*—In nearly every case in which the age was noted the mother was well advanced in her child-bearing life when she gave birth to a dropsical infant. In six cases only was the age less than 30,—23 years (63), 24 years (56), 25 years (29), 28 years (29, 62), and 29 years (45); in all the others it was 30 or more,—30 years (15, 28, 40), 31 years (27), 32 years (58), 33 years (49, 55), 34 years (30), 35 years (34, 61), 36 years (35), 37 years (66), 42 years (17, 19, 67), 44 years (33).

B. *Previous General Health, etc.*—Prior to the pregnancy which terminated in the birth of a dropsical infant some mothers had enjoyed good health, whilst others had always been delicate or had suffered from serious illnesses, but the number of cases in which details upon these points were given was small. Those in which the previous general health was stated to have been good were Nos. 17, 19, 28, 40, 63, 66, and 67; those in which it was noted that the mothers had had syphilis were Nos. 16, 39, and 47; and those in which there had been long-continued delicate or bad health were Nos. 27, 30, 34, 43, and 45. In one or two cases it was noted that the mother was of a phlegmatic and bilious temperament (7, 29), and in one she was alcoholic (21). Pulmonary complaints were mentioned in the records of Nos. 27, 40, and 42, and stomach troubles in No. 30.

C. *Sexual History of Mother.*—1. *Menstruation.*—In only a few cases was there any note of the menstrual type and habit of the mother. In No. 17 menstruation began at 15 and was always regular; in No. 27 the flow was at first regular, but afterwards became small in quantity and irregular (this may have been due to the pulmonary disorder); in No. 30 there were menstrual anomalies; in No. 45 the menses began at 15, were first regular, but became irregular later; in No. 64 they first appeared at 16,

were regular but profuse (lasting eight days); and in my cases (Nos. 55 and 66) and in No. 67 the menstrual history was good.

2. *Previous Pregnancies and Labours.*—In several of the reported cases full details of the past pregnancies were given, *e.g.*, in Nos. 34, 37, 40, 43, 45, 49, 61, 64, and 67.

With regard to the *number of past pregnancies*, in only one of the recorded cases was the mother reported to be primiparous (No. 57); in all the others she was multiparous, and had usually had a large number of gestations. Thus, she was a ii.-para in Nos. 26, 29 (*b*), 62, and 63; a iii.-para in Nos. 27 and 37; a iv.-para in Nos. 9, 19, 36 (*a*), 43, and 45; a v.-para in Nos. 29 (*a*) and 36 (*b*); a vi.-para in Nos. 33, 40, 58, and 61 (first of three dropsical infants); a vii.-para in Nos. 13, 28, and 35; an viii.-para in No. 61 (second dropsical infant); a ix.-para in Nos. 17, 34, 49, 55, 61 (third dropsical infant), and 67; and in my cases (Nos. 55 and 66), the ninth, tenth, and twelfth pregnancies ended in the birth of dropsical fœtuses.

In many cases no details of the *characters of the previous pregnancies* were given, but in some they were forthcoming. In No. 13 the six previous gestations had all ended prematurely; in No. 17, from the eight previous pregnancies had resulted seven healthy infants and one that had died of jaundice; in No. 19 the first had been a living infant, the second a dead one at the full term, and the third a dead one at the seventh month; in No. 27 the two previous gestations had produced two living but scrofulous children; in No. 29 (*b*) the preceding pregnancy had terminated prematurely; and in No. 30 the first gestation ended in the birth of a living healthy infant, and the second in twins that died at birth. In No. 31 there were first several healthy infants and then two dropsical in succession; and in No. 33 there were five earlier pregnancies, of which the fourth ended in the artificial delivery of a hydrocephalic fœtus accompanied by hydramnios and a large placenta. No. 34 had an interesting history. The first child was a healthy male, then came two miscarriages at the third month, then a healthy full-time female, then an abortion at the sixth week, a full-time female that was jaundiced and died in three days, then a still-born female at the twenty-sixth week, and finally a still-born male also at the twenty-sixth week. In No. 36 there were first two healthy infants and then three premature children at about the sixth month. In No. 37 the dropsical infant was preceded by a living healthy child and a dead-born premature one. In No. 40 the first child lived nineteen days, the second five and a half months, the third and fourth were still alive, and the fifth, a male, died in sixteen days. In No. 43 there was first a miscarriage and then two healthy infants, still alive. There were three previous pregnancies in No. 45, and all the infants died of convulsions, the first at the ninth month, the second at the sixth, and the third at the third. In No. 49 there were first four normal gestations, then in the fifth version was

necessary for a full-time dead infant, the sixth and seventh ended in the birth of dead infants, and the eighth came to a premature end with molar degeneration of the placenta. In Löhlein's cases, as reported by Fuhr (Nos. 58 and 64), the previous obstetrical record was interesting. The first child, a female, was weak, rickety, and scrofulous, and died of meningitis when four years old; the second, a female, born at the full term, died of fits at the sixth month; the third, a full-time male, died of general weakness; the fourth, a female, born at the thirty-sixth week, died in two days with ascites; and the fifth was a female born at the full term and still alive. In Cohn's case (No. 61) the five first pregnancies ended in abortions; the sixth at the eighth month in a dropsical infant with commencing maceration and a large dropsical placenta; the seventh in a normal living child; the eighth at the seventh month in a dead dropsical fœtus with œdema of placenta; the mother had œdema and dyspnœa in all her pregnancies, and suffered from chronic nephritis. In No. 63 there was one previous healthy infant; and in No. 67 there were eight full-time children, all of whom were alive, save one that died from long duration of labour. The history in my cases has been already given; it resembled that in Nos. 34, 61, and 64.

3. *Present Pregnancy.*—In the majority of the cases some details of the pregnancy which ended in the birth of the dropsical fœtus were forthcoming.

As regards the *age of the gestation when labour set in,* it was found that in many cases the infant was prematurely born. The pregnancy terminated at the fourth month in No. 5; between the fourth and fifth months in No. 2; at the sixth month in Nos. 12, 36 (*a* and *b*), and 66 (*b*); at six and a half months in No. 34; during the seventh month in Nos. 16 (*a*), 19, 24, 27, 35, 46, 49, and 57; during the eighth month in Nos. 3, 9, 10, 13, 17, 29 (*a* and *b*), 31 (*a*), 40, 47, 51, 56, 61, 63, and 66 (*a*); and at or near the full term in Nos. 4, 7, 8, 16 (*b*), 26, 28, 33, 37, 43, 45, 60, and 62.

The *health of the mother during pregnancy* was seldom said to be quite good. Usually she suffered from one ailment or another. *Maternal dropsy,* limited or widespread in area, was a comparatively common complication. Its presence was specially noted in Nos. 5, 13, 14, 27, 30, 33, 34, 40, 45, 47, 56, 61, 64, and 67; and its absence in Nos. 4, 7, 8, 9, 11, 12, 15, 16 (*b*), 17, 19, 21, 29 (*a* and *b*), 31, 35, 36, 37, 49, 63, and 66. The unusually great degree of *distension of the mother's abdomen* during the pregnancy was also a frequently noted symptom. This condition was in part due to the large size of the fœtus and placenta, but it was also produced by the hydramnios which so often was found as a concomitant state. *Hydramnios* was specially mentioned in Nos. 11, 12, 17, 27, 28, 29 (*a*), 31, 33, 34, 35, 37, 42, 49, 57, 61, 62, 64, and 66 (*a* and *b*). There was a slightly increased quantity of liquor amnii in No. 67. In a few cases there was not much amniotic fluid (Nos. 40, 43, 45,

and 56). The great size of the mother's abdomen was also mentioned in some cases in which there was no note as to the presence or absence of hydramnios, as in Nos. 8 and 9, and in one in which the liquor amnii was small in amount (No. 45). *Albuminuria* was noted in certain cases, and in these instances it may be remarked that maternal dropsy was also a prominent symptom (Nos. 27, 34, 45, 56, 61, and 64). In No. 37, in which there was only a slight trace of albumen in the urine, there was no maternal œdema.

In one or two cases maternal *anæmia* was noted as a marked condition during pregnancy (Nos. 49, 66, and 67); in No. 40 there was a hydræmic or leukæmic state of the blood; and in none of these instances was there albuminuria, although in one (No. 67) there was localized œdema.

Hepatic derangements were noted in Nos. 27, 34, and 67; headache was specially mentioned in Nos. 7 and 45; and pulmonary congestion and bronchial catarrh were present, in addition to other morbid states, in Nos. 26 and 27. In Nos. 15, 19, and 29 (*a* and *b*) a fall occurred during pregnancy, and in No. 15 the fall was followed by strangury and retention of urine. In one case (No. 54 *c*) the mother suffered from malaria, and in two (Nos. 30 and 64) she had heart disease. In Nos. 16 (*b*), 19, 39, and 47 there were signs of maternal syphilis during pregnancy, but in the great majority of cases it was especially stated that this disease was not present. In one of the older cases (No. 4) it was noted that the mother had drunk copiously of beer, and she was alcoholic in No. 21. In No. 49 peritonitis existed during gestation, and proved fatal after delivery.

Very rarely was any mention made of *peculiarities in fœtal symptomatology* during pregnancy. Weakness of the fœtal movements was noted in No. 8; and in No. 27 the motions were never violent, and diminished in intensity and ultimately disappeared after a mental shock which the mother received. Feeble movements were also observed in Nos. 31 (*b*) and 57. In No. 17 there were no signs of life for twenty-four hours before delivery, and in a few other cases it was known that the infant was dead before labour set in.

4. *Characters of Confinement.*—In most cases more or less full details are given of the confinement, and in many instances the labour was tedious or instrumental.

Abnormal *presentations* were unusually common. The head presented naturally in Nos. 8, 13, 28, 29 (*b*), 31 (*a*), 33, 34, 35, 37, 43, 50, 56, 57, 61, 63, and 64, and the presentation was probably normal in several cases in which no mention is made of the circumstance. The breech presented in Nos. 19, 40, 66 (*b*), and 67, and the feet in Nos. 17, 27, 45, and 51. In Nos. 29 (*a*), 30, and 49 there was a shoulder presentation, and in No. 47 the fœtal umbilicus was the part first felt at the os uteri. Out of twenty-eight cases in which the presentation was noted, in twelve it was

preternatural. It must not, however, be concluded that the abnormal character of the presentation was due solely to the disease of the fœtus, for in eleven out of the twelve cases in which some part other than the head presented there was the element of prematurity to be taken into account.

The labour was most commonly greatly delayed, but in Nos. 26 and 66 (*a*) the confinement was rapid. In several cases there was delay, but ultimately the difficulty was overcome by the unaided natural efforts (Nos. 29 (*b*), 31 (*a* and *b*), 34, 35, 43, 45, and 56). Usually the head or a foot (according to the presentation) was expelled by the uterine force alone, but then great delay occurred, and the trunk remained firmly wedged in the pelvic canal. Sometimes the difficulty was overcome by making firm and prolonged traction upon the protruded part by the hands (as in Nos. 8, 28, 50, 64, and 66 (*b*)); or with a hook in the axilla or groin (as in Nos. 37 and 40). Sometimes the use of forceps was needed to extract the head (Nos. 13 and 61); and in other cases version was first employed to convert a transverse presentation into a footling (Nos. 10, 29 (*a*), 30, 47, and 49). In many cases, however, none of these measures was sufficient alone, and paracentesis abdominis fœtus was required in order to reduce the bulk of the infant and make it possible for it to pass through the pelvic canal (as in Nos. 17, 27, 33, 47, and 49). In some instances paracentesis abdominis did not suffice; the evisceration of thorax and abdomen and the separation of the head had to be effected before complete delivery took place in No. 63, and the detached head had to be craniotomised and extracted with the cranioclast in No. 67. In one instance (No. 13) accidental paracentesis abdominis occurred through tearing of the tissues of the anterior abdominal wall; this was followed by escape of the fluid and delivery. In a good many cases the birth of the infant was rendered still more difficult by the great friability of its tissues, as in Nos. 27, 33, 40, 49, 57, 63, 64, 66, and 67. Finally, in one of the older cases (No. 15) the mother's bladder had to be punctured before the child could be born.

The third stage of labour was usually rendered somewhat difficult on account of the large size of the placenta; but this was not invariable (*e.g.* Nos. 31, 64, and 66). The after-birth had in several instances to be extracted manually, and sometimes in fragments, as in Nos. 17, 19, 29 (*a*), 40, 47, 49, and 67. In one or two cases it was noted that there was considerable hæmorrhage both before and after the birth of the placenta (No. 34).

5. *Characters of Puerperium.*—In by far the greater number of the cases the mother recovered quickly and completely from the effects of the pregnancy and labour, the puerperium being quite normal (Nos. 13, 17, 26, 27, 29 (*a* and *b*), 30, 31, 33, 34, 40, 45, 57, 61, 63, 64, and 66 (*a* and *b*). In the cases in which maternal dropsy, albuminuria, or hepatic disorder had existed in pregnancy,

these morbid states rapidly disappeared after the birth of the child (Nos. 26, 30, 34, 45, 61, and 64). In two or three cases only did death occur: from peritonitis in No. 49, from nephritis three weeks afterwards in No. 56, and from puerperal fever and vulvar diphtheria on the tenth day in No. 67.

6. *Later Obstetrical History.*—In very few of the recorded cases was there any note of the clinical history of the mother after the confinement which had terminated in the birth of a dropsical infant, but in one or two instances information bearing upon this very interesting question was forthcoming. In No. 29 a new pregnancy quickly followed the birth of the dropsical infant, and at the seventh month of this gestation the patient had an attack closely resembling that from which she had previously suffered and which had caused premature labour; she had the symptoms of peritonitis, but under treatment these passed off, and the woman was delivered at the full term of a healthy infant and a slightly diseased placenta. In No. 40 the mother afterwards gave birth to a normal child. In No. 57, in which three dropsical fœtuses had been born to the same woman, another pregnancy occurred in which there was neither maternal albuminuria nor dropsy, and this terminated at the third month in the expulsion of a macerated fœtus and a small placenta with a very thick decidua serotina. In No. 64 two pregnancies followed the birth of the dropsical infant: the first ended at the third month in the expulsion of an abortive ovum 5 cms. in diameter without any trace of a fœtus, but with a slight degree of molar degeneration, and the second had at the time of writing advanced normally to the sixth month.

D. *Medical History of the Father.*—Details of the medical history of the father are rarely found in the records of cases of fœtal disease, and this is specially true of those relating to cases of general dropsy. In No. 17, however, it was noted that the father had suffered from jaundice, and that during his wife's pregnancy he had died from dropsy and asthma. The father in No. 57 showed no signs of syphilis, and in No. 64 he was of alcoholic habits, but had not suffered from venereal disease or skin eruptions. In No. 63 there was found the note that there was no history of cancer on the father's side, and in No. 67 the remark that the father was free from syphilis. The state of the health of the father in my case (No. 66) has been already given.

E. *Clinical History of the Infant.*—The clinical history of the dropsical infant was always very imperfect, for it seldom survived its birth by more than a few hours. With regard to its *sex*, it was a male in Nos. 1, 2, 3, 5, 19, 24, 30, 31 (*a* and *b*), 34, 35, 54, (*b*), 63, 66 (*a*), and 67; and a female in Nos. 4, 7, 40, 42, 43, 45, 54 (*c*), 56, 57, 64, and 66 (*b*). In the other cases the sex is not given. In some instances the infant was born alive and survived for a short time: for a few days in No. 4; for twelve hours in Nos. 11 and 16 (*a*); for ten hours in No. 28; for a few hours

in Nos. 7, 8, 43, and 62; for one hour in Nos. 16 (*b*), and 24; and for a few minutes in Nos. 10 and 13. In other cases it was still-born and could not be resuscitated although the heart beat for some time (Nos. 26, 30, 31 (*a* and *b*), 34, 35, 40, 45, 47, and 66 (*a* and *b*). Sometimes it was alive during labour, but died on account of the instrumental delivery, as in Nos. 17, 37, 49, 56, 57, 63, 64, and 67; and occasionally it had succumbed before the confinement (Nos. 19, 33, and 61). In yet another group of cases labour occurred before the fœtus had arrived at a viable age (Nos. 2, 5, 12, 36, and 66 (*b*).

Pathology.

The morbid anatomy of the fœtus and placenta now fall to be considered, and in this relation it may be noted that whilst some writers have given very full descriptions of the diseased infant and its after-birth, others have contented themselves with recording scarcely more than the bare fact that a dropsical fœtus was born. The most valuable dissections are those recorded in Nos. 5, 16 (*a* and *b*), 17, 24, 30, 33, 34, 35, 37, 39, 41, 43, 45, 50, 51, 54 (*a*, *b*, and *c*), 56, 57, 60, 63, 64, and 67.

A. Morbid Anatomy of the Fœtus.

I. *Macroscopic Characters.*

The *weight* and *measurements* of the fœtus were not often recorded; but when they were noted it was always found that they were larger than they ought to have been for the age of pregnancy arrived at. In length the fœtus measured four fingers in No. 1; six inches in No. 5; more than an ell in No. 9; 15 inches in No. 30; 41 cms. in No. 40; 42·8 cms. in No. 43; 49 cms. in No. 45; 46 cms. in No. 49; 41 cms. in No. 56; 51 cms. in No. 64; 43 cms. and 35 cms. in No. 66 (*a* and *b*); and 44·5 cms. in No. 67. The weight of the infant was from 16 to 17 lbs. (French) in No. 8; about 3 lbs. in No. 10; 2950 grammes in No. 40; 3180 grammes in No. 45; 3100 grammes in No. 49; 2200 grammes in No. 56; 3320, 2900, and 3100 grammes in No. 61; 3490 grammes in No. 63; 3810 grammes in No. 64; 1300 grammes in No. 66 (*b*); and 3000 grammes (without fluid and cranial contents) in No. 67.

In some eleven cases more detailed external measurements of the dropsical infants were given (Nos. 24, 43, 45, 54 (*a*, *b*, and *c*), 56, 64, 66 (*a* and *b*), and 67). In No. 24 it was stated that the circumference of the abdomen was about 42 cms.; in No. 43 that of the head was 33 cms.; in No. 45 the cranial circumference was 36·5 cms., the O.M. diameter 14·5 cms., and the O.F. 10 cms.; in the three fœtuses described by Hönck (No. 54) the thoracic diameters were given; in No. 56 the large cranial circumference was 34 cms., that of the abdomen 36 cms., whilst the measurements of the limbs showed that those of the right side were markedly

greater than those of the left side; in No. 64 the head circumference was 33 cms., the O.M. diameter 12 cms., the s.O.B. 9 cms., the Bi-P. 9 cms., the Bi-T. 8½ cms., the circumference of the shoulders 37 cms., and of the abdomen 51 cms., etc.; the measurements in No. 66 (*a* and *b*) are recorded elsewhere; and in No. 67 the diameters of the head, shoulders, etc., were greater than is usual at the eighth month of pregnancy.

A *general dropsical state of the subcutaneous tissue* was the most evident and most constant macroscopic condition found in this disease of the fœtus. It was noted in all the cases (Nos. 1 to 67). The specimens were variously described as universally dropsical; generally, very, or altogether œdematous; extremely or universally anasarcous, etc. It was sometimes stated that certain parts of the body were specially dropsical, as the scalp (Nos. 2, 17, 30, 31, 34, and 61), the face (Nos. 19, 28, 35, and 67), the limbs (Nos. 13, 19, 26, 37, and 61), and the scrotum (No. 31). Usually the subcutaneous effusion was described as serous in character, sometimes as resembling partly congealed gelatin (Nos. 5 and 66), and sometimes as sanguinolent (Nos. 16 and 36). The fact that pressure caused deep pitting of the surface of the body was often noted, as was the oozing of a serous fluid from superficial cuts and tears of the integument. In some cases the great hardness of the skin was described, and in one case it was said that so tense was the integument that the limbs could not be bent without tears occurring. In one case (No. 30) it was said that the serous fluid contained albumen but no sugar; and in another (No. 45) the skin was described as much thickened and in a state like elephantiasis. So great was the œdema in some cases as to cause positive deformity (Nos. 30, 35, 43, and 67). In a few instances the anasarca was accompanied by the presence of vesicles or blebs on the skin-surface (Nos. 19, 33, and 64). The existence of a cephalhæmatoma was noted in Nos. 41, 54 (*a*), and 66 (*a*), and there was some intracranial hæmorrhage in Nos. 45, 54 (*c*), and 66 (*b*). With regard to the colour of the skin, it was usually described as dusky red, livid, coppery, or pink. In my cases (No. 66, *a* and *b*) it was dark pink, with patches that had a glossy yellow appearance.

Another frequently noticed character of this disease was great *friability of the tissues*, especially of the subcutaneous, but also of the muscular and osseous. So marked was this in some cases (Nos. 47 and 57) that the authors named it in the general title of their papers. The friability of the parts was usually discovered during the extraction of the fœtus, when in several cases the tissues of the neck gave way (Nos. 33, 40, 56, 63, 64, and 67). In one instance (No. 13) tearing of the anterior abdominal wall took place; in another (No. 47) the lower jaw was torn off; in others (Nos. 33, 47, 49, 57, 63, 66 (*b*), and 67) the limbs gave way; and in many cases the skin was lacerated in various places. The friable character of the tissues was probably due to their sodden condition,

for the skin, subcutaneous, muscular, and fascial structures were all infiltrated with serum. It will be seen later that usually the placenta and umbilical cord were also œdematous and easily torn.

In the great majority of the reported cases the presence of *fluid in the pleural, pericardial, and peritoneal cavities* was noted. In only one or two instances was the state of the serous cavities not mentioned (Nos. 51, 54 (*b* and *c*), and 60. The presence of fluid in the abdominal cavity was a very constant feature, and the effusion was described as clear, straw-yellow, light yellow, brownish yellow, olive-green, clear green, citron coloured, or brownish in colour, and transparent in character. Sometimes (Nos. 34, 36, and 56) it was noted that there were flakes of lymph floating in the fluid. Occasionally the remark was made that the effusion was albuminous (Nos. 30, 35, and 37); and in one of my cases the proportion of proteids was very small, and there was bile-pigment present (No. 66, *b*). In several specimens there was serous effusion in the pleural sacs as well as in the peritoneal (Nos. 3, 15, 16 (*a* and *b*), 19, 20 (*a* and *b*), 21, 22, 28, 34, 35, 36, 41, 43, 45, 46, 50, 54, 56, 57, 62, 64, and 66), and the fluid was clear yellow serum. In many instances there was also hydropericardium (Nos. 16 (*b*), 19, 20 (*b*), 21, 24, 28, 30, 34, 35, 36, 41, 43, 46, 50, 54 (*a*), 56, 57, 62, and 66). In one or two cases there was hydrocele (Nos. 19, 31, 35, and 66 *a*); and in a small number of specimens hydrocephalus (Nos. 22, 24, 30, 33, 45, and 50). In Nos. 50 and 64 there was also spina bifida. The quantity of fluid in the abdomen was occasionally given: three pints (Paris) in No. 8; two pounds in No. 24; 500 grammes in No. 49; 450 grammes in No. 56; 200 cub. cms. in No. 64; and 150 cub. cms. in No. 66 (*b*). There were 100 cub. cms. of fluid in the thorax in No. 64, and 12 cub. cms. in No. 66 (*b*).

The complete dissection of the dropsical fœtus was not always made; but in the more recently reported cases a thorough post-mortem was usually carried out.

The *appearances presented by the viscera* were far from being uniform, indeed they varied within wide limits. Perhaps the most frequently recorded character was a general bloodlessness of the organs; this was noted with regard to some or all of the viscera in Nos. 5, 14, 16 (*a*), 41, 56, 57, 66 (*a* and *b*), and 67. The *brain* was in some cases found to be pale, in others congested, and the same statement was true of the cerebral membranes; but in a large proportion of cases these structures were not described. In Nos. 5, 16 (*a*), and 56, the brain was pale; in Nos. 16 (*b*), 20 (*b*), and 30 it was congested; in Nos. 24, 33, 41, and 63 the cerebral or spinal membranes were œdematous; and in Nos. 56, 57, 63, and 64 there were meningeal hæmorrhages.

The *heart* was stated in some instances to be normal (Nos. 20 (*b*), 34, 37, 45, 56, 57, 64, and 66); in other cases it was pale and

anæmic; but in a small group of specimens it was the seat of disease or malformation (Nos. 30, 35, 43, and 60). In No. 30 there was transposition of the cardiac vessels, along with a defect in the septum of the ventricles, narrowing of the pulmonary orifice, and the signs of fœtal endocarditis; in No. 35 there was a closed condition of the foramen ovale, whilst the ductus arteriosus was widely patent, and the same condition was found in No. 60; and in No. 43 there was persistence and stenosis of the truncus arteriosus communis, and defect in the septum of the ventricles (*cor triloculare biatriatum*). In one or two cases the displacement of the heart by the distension of the abdomen was noted (Nos. 24 and 66); and in some instances cardiac hypertrophy was described: of the right ventricle in No. 54 (*b* and *c*), and of the left in No. 63. A thin-walled condition of the large blood-vessels was mentioned in Nos. 30, 41, 56, and 66.

The *lungs* were nearly always described as unexpanded or imperfectly distended. They were said to be healthy in Nos. 16 (*b*), 28, 34, etc., œdematous in Nos. 5 and 20 (*b*); pneumonic in No. 20 (*a*); pale and very dense in No. 30; and solid in No. 62. There was cystic dropsy of the right lung in No. 45.

The *thymus* gland was not often referred to; but in one or two cases it was described as pale and anæmic, and in No. 30 it was said to be imperfectly developed.

A diaphragmatic hernia leading to compression of the vena cava inferior was noted in No. 50, and a spurious left-sided one existed in No. 64.

Signs of *peritonitis* were found in Nos. 19, 20 (*b*), 28, 30, and 46; but in several cases it was stated that there was no evidence of this disease.

The *liver* had no constant appearances. It was small in Nos. 16 (*a*), 30, 34, and 43; larger than normal in Nos. 17, 20 (*b*), 31, and 41; anæmic in Nos. 5 and 36; congested in No. 45; soft and friable in Nos. 17, 31, 34, and 36; firm, contracted, or cirrhotic in Nos. 30, 43, and 56; and it had a small third lobe on the left side in No. 64. The liver, like the other abdominal viscera, was transposed in No. 30; and it showed fatty degeneration at some points in No. 57.

The *spleen* also varied in the appearances which it presented. In some cases it was large (Nos. 19, 20 (*b*), 31, 41, 43, and 56); in No. 30 it was relatively small; it was congested in No. 45, and friable in No. 31; and it was firmer in consistence than normal in Nos. 30 and 43. Enlargement of the mesenteric glands was mentioned in No. 19. The *intestines* were usually described as small and contracted with a short mesentery (Nos. 17, 30, 31, 34, 41, 45, 56, 63, and 66); they contained but a small quantity of meconium, and occupied only a small part of the abdominal cavity. The *pancreas* was rarely mentioned, once or twice it was described as pale and anæmic (No. 56), once as small and denser in con-

sistence than normal (No. 30), and once as studded with purpuric spots. It was transposed like the other viscera in No. 30.

From an etiological point of view the state of *the kidneys* ranked next in importance to that of the heart. In some cases the renal organs appeared normal to the naked eye (Nos. 24, 34, 41, 64, and 66); in one instance they were said to be small, soft, and pale (No. 56); in No. 30 they were finely granular, and of greater density than normal; and in Nos. 54 (*b*) and 63 they were the seat of complete cystic degeneration and were greatly enlarged. In No. 63 the renal vessels were very small and atrophied, and in No. 57 the left ureter was dilated.

The *bladder* was usually described as healthy, sometimes as pale, and sometimes as containing a little non-albuminous urine. A structure supposed to be a remnant of the primitive kidneys was described in No. 43.

There was a uterus septus with vagina duplex in No. 54 (*c*), and in No. 30 there was an undescended testicle on the left side; but in the other specimens the *genital organs* were probably normal. It was sometimes stated that the *muscles* were pale and bloodless (Nos. 30, 56, 66); but in other instances there were numerous purpuric spots in their substance (No. 16 *a* and *b*). It was in a few cases noted that the *bones* were soft and easily broken (Nos. 30 and 57); in No. 57 also there was pseudo-anchylosis of the scapulo-humeral and coxo-femoral joints; in No. 64 there was talipes varus; and in No. 67 a condition like talipes equinus. Curvature of the spine was described in No. 54 (*a* and *c*). The limbs were rigid and flexed in No. 62.

II. *Microscopic Characters.*

In only seven cases was there any record of a microscopical examination of the tissues of the diseased fœtus (Nos. 34, 39, 41, 56, 63, 66 (*a* and *b*), and 67). In No. 34 the liver was examined, and it was found that there were no well-formed hepatic cells, although the nuclei were present in abundance. In No. 39 there was a syphilitic sclerosis of the arteries of the skin, muscles, liver, and kidneys; their lumen was much diminished, the intima was normal, the muscularis hypertrophied, and the adventitia thickened. The microscopical examination of Jakesch's specimen by Klebs and Eppinger (Nos. 40 and 41) revealed a leukæmoid, if not perfectly leukæmic condition. The kidneys showed a large quantity of lymphoid elements lying between the uriniferous ducts and Müller's capsules, whilst the ducts themselves were normal; the cords of the splenic pulp contained lymphoid cells in such number as to appear as if composed of them; in the liver there was an aggregation of similar cells in the interspaces; and there was the same engorgement with lymphoid elements in the lungs, in the transversely striped muscles, and in the skin. In Sänger's specimen (No. 56) there was

also congenital leukæmia. The peritoneal fluid contained numerous large leucocytes as well as red cells and peritoneal endothelium; the white corpuscles of the blood were increased in number, so that there was one white to three red cells; the splenic pulp consisted almost entirely of leucocytes, most of them with large nuclei and several nucleoli; the liver was crowded with white cells grouped in masses, so that in each acinus there were several of these lymphomata radially arranged round the central vein, and in some places they were nearly as numerous as the liver cells themselves; and, finally, the marrow of the bones was made up almost entirely of leucocytes. Sänger considers Jakesch's specimen and his own as examples of congenital splenic or spleno-myelogenous leukæmia. Similar microscopic appearances were presented by my two specimens (No. 66 *a* and *b*); but the lymphoid infiltration was not so great as that described by Klebs and Eppinger and Sänger. In No. 67 the renal tissue showed a diffuse infiltration with white cells, most marked in the medullary portion of the organ. So intense was this at the apices of the papillæ that one could scarcely recognise the structure of the tubes of Bellini, the epithelium of which was desquamated, or destroyed, or devoid of nuclei; but in the cortex the infiltration was limited to small groups of tubules and glomeruli, and the epithelium was well preserved. The white cells were leucocytes, some polynucleated, others with one large nucleus. A similar condition was met with in the liver: the hepatic capillaries were crammed with white cells; the liver cells had a very granular protoplasm, and some were atrophic and without nuclei. There was nothing of interest in the spleen. The osseous tissue was normal, and there were nowhere any traces of micro-organisms. In No. 63 the microscopical examination of the cystic kidneys was given. The small cysts lay in a stroma of mucous connective tissue richly vascularized; some of them were formed from the excretory tubules, others from the capsules of the glomeruli; and the epithelium which lined them was a single layer of flat cells.

B. Morbid Anatomy of the Placenta and Umbilical Cord.

I. *Naked-eye Characters.*

The macroscopic characters of the placenta were very much the same in all the cases in which they were described. In all the cases its large size was noted; it was said to be three times as large as normal in Nos. 33 and 40, and was described by the writer in No. 37 as the largest he had ever seen; it weighed more than 3 lbs. in No. 17, 3½ lbs. in No. 37, 1920 grammes in No. 49, 900 grammes (but more immediately after expulsion) in No. 56, 2900 grammes in No. 61, 1075 grammes in No. 63, 1100 grammes in No. 64, and 1200 grammes in No. 67; its thickness was stated to be 2¼ inches in No. 29 (*a*), 3 cms. in Nos. 64 and 67, and 5 cms.

and 4 cms. in No. 66 (*a* and *b*); and its diameters were 21 by 18 cms. in No. 64, 19 by 17 in No. 66 (*a*), 20 by 13 in No. 66 (*b*), and 27 by 23 in No. 67.

The placenta was described as soft in consistence, œdematous, and easily torn in the majority of the cases (Nos. 17, 27, 33, 34, 35, 37, 40, 45, 46, 49, 51, 56, 61, 63, 64, 66 (*a* and *b*), and 67). In No. 29 (*a* and *b*), however, there was no serous effusion into the placenta, which was perhaps due to the fact that the infants were dead before birth; there was thickening and softness of the parenchyma. In No. 30 there was an unequal development of the placental lobes, and there were numerous apoplectic infarcts or placental thromboses, some recent, some old; but in most of the other cases hæmorrhages into the after-birth were not described. In a few instances (Nos. 31 (*b*) and 57) the placenta was described as normal to the naked eye. In many cases the anæmic appearance was also referred to, and in No. 40 Jackesch, with what he himself termed a somewhat daring freedom of imagination, compared the birth of the placenta to the slow rolling forth of wool from an over-filled torn woolsack. In several instances the broken up character of the after-birth was noted (Nos. 17, 30, 33, 37, 40, 45, 47, and 66).

The appearances of the umbilical cord were not often stated, but when they were given they were found to be very similar in all the cases. The cord was usually thick and œdematous, often friable (Nos. 17, 47, 57, 63, and 66), and sometimes inserted into the placenta near to one side of that organ. No abnormality of the vessels of the cord was mentioned in any of the cases of dropsy of the single fœtus.

In one instance it was stated that the chorion and amnion were thickened (No. 30); in No. 64 they were described as normal; but in no other case was there any allusion to their characters.

II. *Microscopic Characters.*

In only five cases was there any description given of the microscopical structure of the placenta (Nos. 34, 51, 56, 66, and 67). In No. 34 the placental tufts were thin and badly developed, and the epithelium at their extremities was ill defined and insufficiently developed; in No. 51 the villi were changed in form from increase in size, and there was hyperplasia of the epithelium, the stroma, and the vessels; in No. 56 there was unusual swelling of the connective tissue of the villi, their epithelium was mostly lost, and their capillaries contained leucocytes in the same disproportionately large amount as in the fœtal blood; and in No. 66 (*b*) there was swelling of the villi, increase in their stroma, and some degree of œdema of their epithelial covering. In No. 67 it is stated that no micro-organisms were present in the placenta.

Etiology and Pathogenesis.

It is now possible to approach the difficult question of the nature and cause of general dropsy of the fœtus with some hope of throwing a little light thereupon, for in the preceding pages have been recorded the facts that have been discovered that bear upon the subject. This disease, however, in common with all fœtal maladies, presents very special difficulties to the investigator, for comparatively little is yet known with regard to the effect of maternal, and to some extent of paternal, morbid states upon the health and development of the fœtus. It is necessary, therefore, in the present state of our knowledge to be content with imperfect and partly theoretical explanations of the pathogenesis and etiology of general dropsy of the fœtus.

Of the writers who have described cases of this disease some have attempted no explanation whatever of its cause; but many have discussed the matter more or less fully, and have suggested solutions of the problem which are more or less probable. Investigators have looked in three directions for the cause of general fœtal dropsy. Some have sought for its origin in some morbid state of the mother's health during pregnancy; others in some pathological condition of the father transmitted to the ovum directly through the spermatozoon at the time of fecundation; and yet others in some purely fœtal disturbance. Several later writers, recognising the difficulty of ascribing the cause either to a maternal or to a fœtal state, have supposed that both the mother and the fœtus must show pathological conditions in order to produce general dropsy in the latter.

Some writers, it has been stated, have attempted no explanation of the origin of general dropsy; but it must also be noted that some have looked closely for a cause and found none. Thus Weber (No. 24), although he was able to exclude inflammatory fœtal processes, could find no anatomical cause for the dropsy; in Burton's cases (No. 31, *a* and *b*), in which the fœtus and placenta were carefully examined by Dr Wilks, no explanation was forthcoming; and in Hönck's first case (No. 54 *a*) the pathogenesis was left quite obscure.

The theories of the writers who looked to maternal conditions alone for an explanation of the disease must now be considered. Seeger (No. 4) would seem to connect the origin of the fœtal state with certain circumstances which occurred near the close of the pregnancy. These were, the mother's fright at the breaking out of fire in a neighbouring house, and the fact that she partook of a copious draught of beer! Billard (No. 15) saw an intimate relation between the strangury and retention of urine in the mother (following a fall) and the dropsy in the fœtus; but he attempted no explanation of the *modus operandi*. Montgomery (No. 21) would

seem to hint that the alcoholic habits of the mother had something to do with the production of the fœtal disease. Several older writers (Nos. 5, 6, 13, and 14), noting that the mother of a dropsical infant was also in some instances dropsical, seem to have looked upon the disease as transmitted from the former to the latter. This was a view quite in keeping with the pathology of the time, which looked upon several fœtal diseases—*e.g.*, jaundice, ague, epilepsy, dropsy, etc.—as passing directly from mother to fœtus. Grætzer (No. 18) showed that it was very difficult to accept this theory, by pointing out that many dropsical mothers gave birth to healthy infants, and that dropsical infants were sometimes borne by healthy mothers. The question of the relationship of maternal to fœtal dropsy must, however, be considered again, when the influence of maternal nephritis is under discussion.

Clay (No. 29) opened up the subject of the relationship of the placental condition to the fœtal dropsy. As regarded his first case, he looked upon the anasarca as not due to the state of the placenta (which he regarded as inflammatory), but as produced by the condition of the mother's blood, which in its turn was probably connected with her cachectic state. The anasarca of the fœtus in his second case he ascribed to the hypertrophic character of the placenta; but with regard to both cases he concluded that, although the dropsy arose from different causes, it probably depended upon a poison in the blood of the mother, or upon some other peculiarity in that fluid. Ritter (No. 33) went a stage further, and defined the peculiarity of the maternal blood: he ascribed the fœtal dropsy to hydræmia of the mother. Protheroe Smith (No. 34) found the cause of the maternal albuminuria, anasarca, and jaundice which existed in his case in hyperæmia, and asked whether the same general derangement of the mother might not have been also the causal factor in the production of the fœtal disease. Williams, in the discussion which followed the reading of Bassett's case (No. 37), suggested that the fœtal dropsy might be due to some interference with the renal functions of the placenta which caused the blood of the fœtus to become like that in Bright's disease. Bassett himself looked upon overgrowth of the placenta as the starting-point of departure from health, and upon the dropsy as a sequence to this. Snow Beck (No. 36) suggested as an alternative cause some condition of the mother's health causing defect or deficiency in the blood supplied to the placenta. Ahlfeld (No. 49) seems to have thought that the anæmia of the mother, accompanied by an increase in the number of the white corpuscles in her blood, had something to do with the dropsy of the fœtus. Ruge (No. 51) found no fœtal cause for the dropsy, and was driven to suggest consanguinity of the parents as a possible explanation. Cruveilhier and Simpson (Nos. 16 and 19), although they made no definite statement upon the question, probably regarded maternal syphilis as the cause.

The theory that fœtal dropsy is due solely to maternal nephritis now requires notice. Strauch (No. 45) strongly advocated this view. In his case he was able to exclude syphilis of the parents and leukæmia of the fœtus, and was thrown back upon the nephritis of the mother for an explanation of the general dropsy of the infant. His chain of reasoning was as follows:—The mother had a contracted kidney, and in consequence increased arterial tension and venous stasis. There was, therefore, increased pressure in the maternal portion of the placenta, and an exudation of serum into the intervillous spaces (for he accepted Klebs' theory of the existence of lymph spaces surrounding the villi); this exudation was also predisposed to by the hydræmic character of the maternal blood due to the renal disease; the placenta being the place of least resistance, œdema occurred there, although not in the other maternal organs; and the blood coming from the fœtus in the umbilical arteries met with resistance in the placenta, which caused increased venous pressure and œdema in the fœtus. Strauch also considered that it was probable that the diminished flow of nourishing blood to the fœtus from the placenta, and possibly the transmission to it of hydræmic blood from the mother, might be two further causal influences in the production of the dropsy. Cohn (No. 61), in his paper on the influence of pregnancy-nephritis on the fœtus, reported one case in which a woman gave birth to three dropsical fœtuses in successive gestations; but he did not attempt to explain the connexion between the maternal and fœtal states.

Only one or two writers have sought for an explanation of the origin of fœtal dropsy in paternal morbid states, and they have contented themselves by putting the supposition interrogatively. Thus Seulen (No. 17) asked whether the fact that the father suffered from dropsy, which proved fatal, could be supposed to have caused the dropsy of the infant? and Goldmann (No. 27) put the same question. The case of the brother of the mother of my two specimens may also be quoted in this connexion, for he was the father of a dropsical infant, his wife remaining all the time quite healthy.

A purely fœtal cause was often sought for, but only occasionally found, by investigators. Abnormal conditions of the heart were found in some instances, and were looked upon as causal. Thus, Lawson Tait noted in his specimen (No. 35) the absence of direct communication between the auricles of the heart of the fœtus due to premature closure of the foramen ovale, and to this he ascribed the dropsy of the fœtus and placenta and the hydramnios. The closure was not complete, for there was a crescentic valvular opening, 1-12th of an inch in size. The ductus arteriosus was widely patent. Pott found that the heart of the dropsical fœtus (No. 43) was three chambered (there were two auricles, but the ventricular septum was defective); that there was persistence of the truncus communis arteriosus, and that valvular stenosis of the

ostium arteriosum existed. He argued that the stenosis of the ostium arteriosum caused lowering of the arterial pressure in the fœtus, that the heart attempted to overcome this, and that dilatation and hypertrophy of the ventricle and of the right auricle followed, but were insufficient; and that, in consequence of this failure, effusion of serum into the fœtal tissues took place. Congestion and subsequent cirrhosis of the liver were due to the same cause, and led to the fœtal ascites. Osler (No. 60) found a heart condition very similar to that in No. 35. There was a nearly impervious foramen ovale (a valvular orifice 8 millimetres in length existed) and a very large ductus arteriosus. Osler had, however, to confess that the connexion between the dropsy of the fœtus and the heart anomaly was not very clear.

In Behm's case (No. 50) the fœtus showed several malformations besides the dropsy, and amongst these was diaphragmatic hernia. The writer ascribed the dropsy to the hernia, stating that the drag of the viscera in the pleural cavity compressed and obstructed the vena cava inferior.

In Hönck's second specimen (No. 54 *b*) there was cystic degeneration of the fœtal kidneys. There was, therefore, he argued, an almost completely impervious state of the vessels, and this caused great obstruction to the circulation and consequent escape of serum. Large cystic kidneys existed also in Gueniot's specimen (No. 63).

Other conditions obstructing the fœtal circulation were sometimes found. Thus Schütz (No. 39) discovered in the case of a syphilitic fœtus affected with general dropsy that there was arterial sclerosis of the vessels of the subcutaneous tissue, and to a less degree of those of the kidneys and liver. The lumen of the arteries was considerably diminished, and the walls greatly thickened. Raineri (No. 67) considered that the œdema of the fœtus and placenta might not unreasonably be ascribed to the hindrance of the hepatic circulation and the obstruction to the renal secretion caused by the infiltration of these organs with leucocytes. The state of the liver he regarded as closely similar to the congenital interstitial hepatitis of syphilitic infants.

Abnormal conditions of the fœtal blood have been thought by some to be the causes of the general dropsy. In Jakesch's case, investigated by Klebs and Eppinger (Nos. 40 and 41), "a leukæmoid, if not perfectly leukæmic" state of the fœtus was discovered along with thin-walled veins. Klebs stated that since dropsical phenomena were not rarely met with in leukæmia in adults, they might also be looked for in the fœtus, and indeed were more likely to occur in the latter, because of the surrounding liquor amnii, which prevented the giving off water by the skin and lungs. He looked upon the leukæmia and the thin-walled state of the vessels as the causes of the dropsy of the infant. With regard to the placenta, he regarded the chorionic villi as free from the dropsy,

which he placed in the so-called intervillous lymph spaces. In order to make this theory tenable, it was necessary to cast aside the generally accepted view of the structure of the placenta, which regarded these spaces as blood sinuses.

The etiological theories of those authors who looked for the cause both in the mother and in the fœtus must now be noted. Virchow (No. 30) worked out very fully the causal factors in his interesting case. The immediate cause of the dropsy he found in narrowing of the pulmonary ostium of the heart, accompanied by cirrhosis of the liver and incipient granular degeneration of the kidneys. The state of the heart he ascribed to fœtal endocarditis; and he was supported in this view by the other signs of inflammatory disturbances present in the fœtus,—these were peritonitis, nephritis, hepatitis, and splenitis. The transposition of the viscera which was found might also be of inflammatory origin. The cause of the fœtal endocarditis in its turn, he thought, might be found in rheumatism or in syphilis of the mother; but he was unable to get information upon this point. The thromboses in the maternal placental sinuses he regarded as a third series of disturbances, which by hindering the circulation in the fœtus tended still further to promote the general dropsy. The primary causes of the fœtal disease were, however, the heart defect and the diseased state of the large abdominal viscera. Virchow adopted, therefore, the theory of a mechanical production of the dropsy. Strauch also, as has been said, emphasized a mechanical mode of origin, but admitted that hydræmia of the mother, and perhaps other things too, might have been causal factors.

Hönck, in his third case (No. 54 *c*), sought for the origin of the fœtal dropsy in the existence of malaria with enlarged spleen in the mother, aided by a transmitted malarial state of the blood of the fœtus. The obstructed maternal circulation led to œdema of the placenta, and this in its turn to obstruction in the fœtal circulation.

Sänger (No. 56), like Klebs, found congenital leukæmia in his specimen. The mother showed signs of nephritis (albuminuria, albuminuric retinitis, etc.), but this he did not regard as the direct cause of the fœtal dropsy; for, as he pointed out, dropsical infants were rarely born to mothers suffering from kidney disease. The nephritis of the mother caused the leukæmia of the fœtus, not in a mechanical way, but the hydræmic state of the maternal blood interfered with the normal formation of the fœtal blood, for it produced a dilution of the fluid passing to the fœtus. The leukæmia thus produced was the cause of the dropsy; for the conversion of leucocytes into erythrocytes having been interfered with, the former accumulated in the fœtal blood, escaped through the thin vessel walls, and formed lymphoid infarcts in the glandular organs, lungs, muscles, and skin; and serum escaping along with the leucocytes, caused œdema of the above-mentioned structures.

Sänger considered that a similar transudation of serum took place within the placenta fœtalis, and that fluid passed from the vessels of the villi into the villous connective tissue. He found the blood in the villous vessels leukæmic. He did not, therefore, agree with Klebs, but thought that there was dropsy of both the maternal and fœtal parts of the placenta. Further, he did not accept Klebs' view of the existence of intervillous lymph spaces. Finally, Sänger thought that the leukæmia of the fœtus could not be due to maternal leukæmia, for no leucocytes could pass through the placenta; unfortunately he did not examine the blood of the mother.

The etiology of Lohlein's case (No. 58) was worked out by Fuhr (No. 64), who recognised its complexity, but thought the cause lay chiefly with the mother. He looked upon the spurious diaphragmatic hernia as an effect, not as the cause, of the fœtal dropsy; he excluded from the etiological possibilities the maternal cardiac disorder (mitral insufficiency) because compensation had been established, and the maternal albuminuria because being intermittent it was the sign not of chronic nephritis, but of pregnancy-nephritis predisposed to by the hydramnios and state of the mitral valve; and he assumed, from the existence of spina bifida, that the fœtal dropsy existed before the fourth month of pregnancy, and that the fœtal ascites was prior to the hydrothorax. No microscopical examination of the placenta was made, but Fuhr believed that its large size was due not only to the presence in it of serum, but also to a true hyperplasia of the villi. He looked upon the hyperplasia as primary, and as the cause of the fluid in the fœtus and the hydramnios, whilst to explain the anasarca he deduced fœtal hydræmic plethora from the maternal hydræmia, which in its turn came from the pregnancy and the nephritis. The cause of the hyperplasia in the chorionic villi he found in endometritis of the serotina, and the œdema of the placenta he held to be due to secondary obstruction in the placenta, from the over-filling of the fœtal circulation. The etiological factors he summarized as follows:—(1.) Chronic maternal endometritis, which probably began in the third puerperium, but was intensified in the sixth pregnancy by the nephritis; (2.) The decidual increase thus induced caused hyperplasia of the chorionic villi and the formation of a large placenta; (3.) Then ensued an excessive absorption of fluid blood into the fœtal circulation (favoured, perhaps, by the hydræmic state of the mother's blood), over-filling of the circulation in the fœtus, with resulting obstruction and œdema, for no hypertrophy of heart and kidneys took place; (4.) The hydramnios in the latter part of the pregnancy was to be referred to increased secretion of the kidneys,—an increase, however, insufficient to compensate for the obstruction; and, (5.) The œdema of the placenta was due to secondary obstruction in the placenta.

In addition to the above-mentioned theories brought forward by writers who have described cases of general dropsy in the human fœtus, there are two observations, one drawn from the field of comparative pathology, and the other from that of experimental teratology, which must not be passed over in silence, for they both (but especially the second) serve to throw some light upon the origin of this fœtal disease. L. Franck (No. 44) found in the case of a dropsical calf—the so-called water- or moon-calf—pathological appearances very similar to those met with in the human fœtus affected with general dropsy; and in addition he noted that there was no trace of thoracic duct, mesenteric lacteals and glands, and of lymphatic glands generally. To the absence of these structures he ascribed the dropsy of the calf. The full value of this observation will be better appreciated when we come to speak of dropsy in the twin fœtus, and to consider the specimen of Smith and Birmingham.

The second observation is one that has been made on many occasions by Dareste (No. 65) when experimenting with the artificial incubation of the hen's egg. Both Tarnier (No. 53) and Taruffi (No. 59) refer to this observation when discussing the causation of fœtal dropsy, and suggest that from it conclusions as to pathogenesis may perhaps be drawn. Dareste has shown that various external conditions interfere with the normal development of the embryo in the hen's egg, and he has been able to produce most of the known fœtal monstrosities by altering the environmental conditions during the process of artificial incubation. By raising or lowering the temperature of the surrounding air, by covering the shell of the egg with varnish, by placing the eggs vertically, etc., he has succeeded in so disturbing the healthy development of the embryo as to lead to the appearance of monstrous forms. One of the most common results of this artificial interference with the growth of the embryo chick has been the production of an anæmia, either simple or complicated with dropsy. Now, this artificially produced dropsical anæmia of the chick may serve to throw some light upon the origin of general dropsy of the human fœtus which we have seen to be often associated with anæmia. Dareste has found that it is produced in the following manner. One of the earliest changes in the impregnated ovum of the hen is the formation of the vascular area; this surrounds the embryo, and in it is found a network of bloodvessels surrounded by a circular vein. The network of vessels is formed by the projection and anastomosis of offshoots from the blood-islands which are found in the vascular area, and ultimately the network thus produced is brought into relation with the heart through the omphalo-mesenteric veins and arteries. If this communication be not effected, the blood in the heart and vessels remains colourless, and contains no globules—it is a colourless plasma. Now, Dareste found that by altering the normal external conditions in artificial incubation the "islands of

blood" could be arrested in their development and the canalization of the vascular area prevented. As a result, the blood globules remained stored up in the blood-islands and did not reach the cavity of the heart. In such a case the blood sent by the heart through the body of the embryo remained colourless and transparent, and the organs and tissues with which it came in contact became dropsical, probably on account of the absence of albumen from the circulating fluid. Dareste also noted that the fluid not only lay between and within the mesodermic cells, but might accumulate in the pleuro-peritoneal sac, in the cerebro-spinal canal, and in the amniotic cavity. This condition was always found to be produced at a very early period in the development of the embryo. When the dropsical anæmia was complete it brought about the death of the chick, but when incomplete it caused various malformations, such as spina bifida, anencephaly, etc.

It is now possible to group together in a provisional manner the probable causes of general fœtal dropsy, although it cannot, of course, be affirmed that each group is distinct from and independent of the others. No doubt they overlap to a considerable extent, and may possibly all be present as etiological factors in some cases.

I. It is within the limits of possibility that there may be a group of cases in which the primary pathological impulse comes from the father, and is impressed upon the ovum by the spermatozoon at the time of fertilization. It must be admitted that little is definitely known of the influence of paternal conditions upon the embryo; but still it is not to be denied that the only rational explanation of certain cases of fœtal disease and of the transmission of some physiological and pathological peculiarities is to be found in the existence of such influences in the spermatozoa. Some cases of hereditary syphilis, and some of transmitted structural anomalies affecting only the males, may be cited as examples. No one has yet affirmed that in general fœtal dropsy the cause lay with the father; but two or three writers have put the matter interrogatively, and in connexion with my own cases it is a striking fact that a sister and a brother, both markedly anæmic, should have in the one case borne and in the other begotten a dropsical infant. It rests with future observers to scrutinize this possible group of factors, and to eliminate it from or establish it in the etiology of the disease.

II. In a second group of cases it may with some confidence be affirmed that the cause of the dropsy is to be found in a lesion of the fœtus itself. When general dropsy in the twin fœtus comes to be considered, it will be seen that in nearly every recorded case an adequate fœtal cause has been discovered; but this is not so with regard to general œdema of the single infant, for although most writers state that they sought for a fœtal cause, they have in many cases to confess that the search was without result. As was to be

expected, the attention of observers has been turned chiefly to the state of the fœtal heart and kidneys.

In three cases (Nos. 35, 43, and 60) cardiac malformations were regarded as the direct cause of the general dropsy, and in two (Nos. 35 and 60) the malformation consisted in nearly complete closure of the foramen ovale with a widely patent condition of the ductus arteriosus. In my first specimen the section unfortunately passed through the foramen ovale, but in my second the foramen was seen to be less patent than it ought to be at the term of intra-uterine life which had been reached, and in both cases the ductus arteriosus was widely patent. If the course of the fœtal circulation be borne in mind, it is possible to construct a theory which will attribute the dropsy of the fœtus and placenta to the above-named anomaly. It is necessary to grant that the passage of the blood (arriving in the right auricle from the inferior vena cava) through the foramen ovale is greatly impeded by the almost complete closure of that opening. In such a state of matters the blood will tend to pass through the tricuspid opening into the right ventricle, but its progress will be impeded by the Eustachian valve, and so the blood-pressure in the right auricle will rise. This effect will be intensified by the arrival in the same chamber of the blood from the vena cava superior. The consequence of this will be a rise in pressure in all the parts from which the vena cava comes (the whole body and placenta), and, adopting the theory of the mechanical origin of dropsy, there will result serous effusion, affecting first the placenta, which is the extreme limit of the circulatory system of the fœtus, and later the whole body of the infant. If, as has in some cases been found, the vessel walls be thin, the escape of serum will be rendered the more easy on that account. This theory explains also the dilatation of the ductus arteriosus, for through it the greater part of the blood must pass into the aorta. In a somewhat similar way the general dropsy in Pott's case (No. 43) may be explained. Here the stenosis of the ostium arteriosum of the three-chambered heart probably led to obstruction in the venous system, and, since hypertrophy of the right auricle and of the single ventricle did not occur, effusion of serum followed; the cirrhotic condition of the liver caused by the congestion explained the ascites. If it be granted that in some cases of general dropsy the above-named mechanical theory is the correct one, still the cause of the heart lesion is left obscure, and it can only be surmised that it may have been due to localized endocarditis of unknown origin. In Virchow's case (No. 30) there is ground for supposing that the cardiac anomalies were due to fœtal endocarditis, for there were other inflammatory states present, *e.g.*, peritonitis. The narrowing of the pulmonary ostium, the hepatic cirrhosis, and the incipient granular renal degeneration, were regarded by this writer as the immediate cause of the dropsy. Virchow, therefore, like Tait, Osler, and Pott, adopted the

mechanical theory of origin; but, unlike them, he recognised that some maternal influence (rheumatism or syphilis) must be invoked to explain the fœtal inflammatory states.

Other writers have ascribed the dropsy to an obstruction in the circulatory system outside the heart. Behm's supposition that the diaphragmatic hernia compressed the inferior, and to some extent also the superior vena cava, and so led to general dropsy, whilst it may have held for his case, must be looked upon as one of the rarest of all causes. Obstruction to the blood-flow through the kidneys from cystic degeneration of these organs (Nos. 54 *b* and 63) can scarcely be regarded as a sufficient cause of general dropsy, for cases of cystic kidney in the fœtus in which there was no dropsy have not infrequently been recorded. If, however, this cause be accepted, it would seem more rational to ascribe the dropsy to the pressure exerted by the large renal tumour upon the vena cava inferior or upon some other large vessel. The obstruction caused by the infiltration of liver and kidneys with leucocytes (No. 67) is another theory of origin which it is very difficult to accept as a complete explanation of the disease, for the effects appear so much greater than the cause.

The question of the relationship of syphilis to this disease will be discussed later; and with regard to the theory of the lukæmoid origin of the dropsy, that matter will more conveniently be considered along with the alleged combined maternal and fœtal causes. In the meantime it may be granted as probable that in some cases the fœtal dropsy is due to fœtal causes leading to obstruction of the circulation either in the heart or in the large vessels, the dropsy in these specimens being regarded, therefore, as mechanical in origin, an œdema of engorgement. This view receives some support from the fact, that in the cases in which a sufficient fœtal cause was found, there was, as a rule, no distinct maternal lesion.

III. It is doubtful whether there are any cases of general fœtal dropsy which can be referred to a maternal cause alone. The older theories (Nos. 4, 15, and 21) may be dismissed as most unlikely explanations, and so may some of the modern ones, *e.g.*, Ruge's (No. 51). The only maternal conditions that require serious consideration are diseased states of the kidneys and of the blood. At first sight there appears to be much in favour of the theory that a maternal disease alone may cause the fœtal dropsy, for the mother of such a fœtus is, in the majority of the reported cases, an elderly multipara who has suffered in various ways during pregnancy (from dropsy, albuminuria, hepatic and gastric disorders, etc.), and has had a bad previous obstetric history. Further, in some cases (Nos. 31, 51, 61, and 66) the same mother has borne two or more dropsical infants in succession. When, however, the clinical facts in the mother's history are closely examined, they are found capable of bearing another explanation, for most of them are quite as likely

to be consequences of the fœtal state as causes of that condition. The anasarca, the gastric and hepatic troubles, and the albuminuria, can all be reasonably explained by the pressure upon vessels and viscera produced by the over-distended state of the uterus, which is in its turn due to the large size of the fœtus and placenta, and to that frequent concomitant of the disease, hydramnios. Further, the rapid disappearance of these abnormal symptoms which usually immediately follows the birth of the infant also supports the belief that these symptoms were effects and not causes of the fœtal disease. One is therefore warranted in concluding that in most cases the albuminuria, when it did exist, was due to a pregnancy-nephritis, and not to a permanently diseased state of the mother's kidneys.

Strauch's case (No. 45) appears to militate against the acceptance of the above statements. The patient, in this instance, seems to have had true granular atrophy of the kidneys, and the author argues that this increased the blood-pressure in the mother, that serous exudation into the maternal portion of the placenta followed, and that in consequence of this there was an obstructed flow of blood through the fœtal part of the afterbirth, and general dropsy of the fœtus. Against this view it has to be remarked that œdema of the maternal part of the placenta is hypothetical, for Strauch did not examine it microscopically, and that in the cases in which the placenta has been investigated in this way the dropsy was found to affect the fœtal part (the chorionic villi) and not the maternal. Further, it is well known that whilst mothers with kidney disease are not uncommon, it is very rare for them to give birth to dropsical infants. The maternal disease has an unfavourable effect upon the infant, for it is often born prematurely (dead and macerated, or alive, feeble, and poorly nourished); but it is quite exceptional for it to be the subject of general dropsy. I had an opportunity recently of examining such a case; the fœtus was still-born and premature, but showed no effusions, and its kidneys exhibited no morbid conditions when viewed under the microscope. Even Strauch, who is the strongest advocate of the theory of the origin of fœtal dropsy from maternal renal disease, is forced to admit that his supposition does not explain all the facts of the case, and that it may be necessary to grant the co-existence of fœtal hydræmia and possibly of other causal factors.

The writers (Nos. 29, 33, 34, and 49) who have looked upon a diseased state of the mother's blood as the sole cause of the fœtal disease do not attempt to explain the *modus operandi*, and those who have supposed that the dropsy had its origin in disease of the maternal placenta alone have not made a microscopical examination of that structure; there is no necessity, therefore, to refer further to these states, at any rate as sole factors, of the disease of the fœtus.

IV. In a fourth group may be placed the cases which appear to

be due to combined maternal and fœtal morbid states, and in the present condition of our knowledge it would seem that here are to be placed most of the specimens of general dropsy of the single fœtus. Several recent writers have taken this view of the case, for it has been found to be almost impossible to discover either in the mother alone or in the fœtus alone a sufficient and satisfactory cause of the dropsy.

It is fair to surmise that in most cases the mother of a dropsical infant has been far from perfectly healthy herself: it is distinctly stated in certain instances that she was anæmic, hydræmic, icteric, or affected with albuminuria, malaria, valvular disease, rheumatism, or syphilis, and in many of the cases in which no such morbid states are mentioned it may be inferred from the clinical history that she was below par, and probably was anæmic to a greater or less degree. Moreover, there is reason to believe that in but few cases was the uterine mucous membrane quite normal, for the history of repeated premature labours or of miscarriages is often forthcoming, and suggests a chronic endometritis that has interfered with the normal formation and functional activity of the maternal part of the placenta. In one case (No. 64) chronic endometritis of the serotina was looked upon by the writer as the cause of hyperplasia of the chorionic villi; but it is unfortunate that in this instance a microscopic examination of the placenta was not made. There are then two possible etiological factors on the part of the mother: these are—the circulation of a vitiated blood in the maternal portion of the placenta, and the abnormal formation of that structure on account of a diseased state of the serotina consequent upon chronic endometritis.

It is possible to suppose that the structural change in the maternal part of the placenta might be so great as to cause obstruction to the circulation in the fœtal part, and so lead to dropsy of it and of the fœtus; but in the absence of direct proof from microscopic examination this hypothesis must be looked upon as very doubtful. It is more likely that the maternal morbid states above named act in a bio-chemical way upon the fœtus, inducing in it diseased processes which are the causes of the dropsy. These processes we may suppose to be due to the fact that an impure or insufficiently nourishing blood is supplied to the fœtus, or that through interference with the excretory functions of the placenta, a hydræmic or otherwise abnormal condition of the fœtal blood is set up and maintained. Virchow (No. 30), for instance, thought that in some obscure way rheumatism or syphilis in the mother set up various inflammatory states in the fœtus, amongst which was endocarditis, which led to a cardiac anomaly which in a mechanical way caused the dropsy. This explanation may prove to be correct in some cases; but it seems more probable that the fœtal change induced is a blood one, and that it produces the dropsy in a chemical rather than in a mechanical way—that, in fact, the dropsy is

cachectic and not congestive or inflammatory in origin. What is the usual nature of the cachectic state of the fœtal blood must for the present be doubtful; it is possible that it may be hydræmic or anæmic, or, as in the cases of Klebs and Sänger, leukæmic. If it be granted that fœtal leukæmia exists and is the cause of fœtal dropsy, it is necessary also to grant that it differs in many respects, but chiefly in degree, from that disease as it is found in adults. Sänger noted with regard to his specimen that the leukæmia must have developed very rapidly, for the appearances found were like those of the most advanced stage in the adult. This fact may serve to explain why it is that general dropsy is only occasionally met with when leukæmia affects the grown-up individual.

As evidence in support of the cachectic origin of fœtal dropsy, I may adduce the results of the analysis of the ascitic fluid in my second case (No. 66 *b*). It will be remembered that the proportion of proteids was exceedingly small, and if we accept Runeberg's statement that ·3 per cent. albumen and below it always indicates hydræmic ascites,[1] it may therefore be concluded that in this case, at any rate, there was a blood dropsy. The thin-walled state of the bloodvessels which has been observed may still further have favoured the occurrence of dropsy. Dareste's experiments seem also to support this view, although it is perhaps scarcely permissible to draw deductions concerning the mammalian fœtus from what happens in the case of the chick. It may, however, be borne in mind that the artificially produced dropsy in Dareste's cases was an anæmic one.

Conclusion.

It may then be said, that whilst in some cases of fœtal dropsy there existed an adequate cause in the fœtus itself, in most instances the disease was due to a chain of factors, having a cachectic state of the mother at one end and a blood disease of the fœtus at the other, with a morbid state of the uterine mucosa and placenta intervening.

Literature.

1. Hippocrates.—*Epidemics*, Book II., section ii. par. 19. B.C. 468.
2. Plater (F.)—*Observationum*, lib. iii. p. 748. Basileæ, 1614.
3. Severin (M. A.)—*De recondita Abscessum natura*, lib. iv. cap. 36. p. 266. Francofurt, 1643.
4. Seeger (G.)—*Miscellanea curiosa medico-physica Academiæ naturæ curiosorum*, Dec. I., Ann. I., Obs. 42, p. 132. Lipsiæ, 1670.

[1] *Deut. Arch. für Klin. Med.*, xxxiv. p. 1, 1883.

5. DORSTENIUS (J. D.)—*Miscellanea curiosa sive Ephemeridum*, Dec. II., Ann. iii., Obs. 153, p. 298. Norimbergæ, 1685.
6. DUETTEL (P. J.)—*De morbis fœtuum in utero materno*, p. 8. Halæ Magdeburgicæ, 1702.
7. LOSPICHLERUS (J. A.)—*Acad. Cæsareo-Leopoldinæ Naturæ curiosorum Ephemerides*, Cent. I. and II., Obs. 150, p. 313. Francofurti et Lipsiæ, 1712.
8. DE LA MOTTE (G. M.)—*Traité complet des Acouchemens*, liv. iv. chap. xi., Observ. 336, p. 497. Leiden, 1729.
9. SCHURIG (M.)—*Embryologia historico-medica*, Sect. iii. cap. i. p. 203. Dresdæ et Lipsiæ, 1732.
10. OSIANDER (F. B.)—*Götting. gel. Anzeigen*, Bd. I., p. 243. 1810.
11. CARUS (C. G.)—*Zur Lehre von Schwangerschaft und Geburt*, Abth. I., p. 152. Leipzig, 1822.
12. LAMOUROUX.—*Bulletin d'el'Athenée de Médecine de Paris.* Avril, 1825.
13. MEISSNER (F. L.)—*Forschungen des* 19 *ten Jahrhunderts, etc.*, vol. iv. p. 133. Leipzig, 1833.
14. OLIVIER.—*Propagateur*, 1825, cited by Hufeland (C. W.), *Journal der practischen Heilkunde*, Bd. 64, pt. i. p. 25. Berlin, 1827.
15. BILLARD (C.)—*Traité des Maladies des Enfans*, p. 451. Paris, 1828.
16. CRUVEILHIER (J.)—*Anatomie Pathologique*, tom. i., livr. 15, plate ii. Paris, 1829.
17. SEULEN.—*Neue Zeitschrift für Geburtskunde*, vol. ii. p. 17. 1835.
18. GRÆTZER (J.)—*Die Krankheiten des Fœtus*, p. 112. Breslau, 1837.
19. SIMPSON (J. Y.)—Case No. 6 in paper in *Edinburgh Med. and Surg. Journal*, vol. l., p. 390. 1838.
20. WEST (C.)—*London Medical Gazette*, p. 716. 1839.
21. MONTGOMERY (W. F.)—Todds' *Cyclop. of Anat. and Physiol.* vol. ii., article "Fœtus," p. 332. 1839.
22. CHANNING (W.)—"Dropsy of the Fœtus; Congenital Hydrocephalus, Ascytes, and Anasarca," *New England Quart. Journal, Med. and Surg.*, i. p. 321. Boston, 1842-3.
23. HOHL (A. F.)—*Die Geburten missgestalteter, kranker, und todter Kinder*, p. 309. Halle, 1850.
24. WEBER (F.)—*Beiträge zur path. Anatomie der Neugeborenen.* Kiel, 1851.
25. FERRIS (E. H.)—*West. Lancet*, vol. xv. p. 18. Cincinnati, 1854.
26. THOMAS (W.)—"On a Case of Congenital Dropsy, Vesicular and Anasarcous," *Lancet*, 1856, vol. ii. p. 303.
27. GOLDMANN (S.)—*De vi quam fœtus hydrope anasarca affectus, etc.*, Diss. Inaug. Viadrina, Vratislaviæ, 1857.
28. WALKER (W.)—"Serous Effusions in a Fœtus," *Brit. Med. Journal*, p. 9. 1858.

29. CLAY (J.)—"Ueber Anasarca des Fötus," *Zeitschrift der Kaiserl. Königl. Gesellschaft der Aerzte zu Wien*, p. 200. 1859.
30. VIRCHOW (R.)—"Ein Fall von Transposition der Eingeweide und ausgedehnten Localerkrankungen beim Neugebornen," *Archiv für path. Anat. und Physiol.*, Bd. xxii. p. 426. 1861.
31. BURTON (J. M.)—*British Medical Journal*, vol. ii. p. 530, 1861, and vol. i. p. 454, 1863.
32. JOULIN (D.)—*Des Cas de Dystocie appartenant au Fœtus*, p. 25. Paris, 1863.
33. RITTER (B.)—"Hydramnios mit Hydropsie und Maceration des Fötus," *Wurtemberg. med. Corrispondenzbl.*, No. 6, 1869.
34. SMITH (PROTHEROE)—*London Obstet. Soc. Trans.*, vol. xvii. p. 303. 1876.
35. TAIT (LAWSON).—*London Obstet. Soc. Trans.*, vol. xvii. p. 307. 1876.
36. BECK (SNOW).—*London Obstet. Soc. Trans.*, vol. xvii. p. 310. 1876.
37. BASSETT (J.)—*London Obstet. Soc. Trans.*, vol. xix. p. 261. 1878.
38. HERRGOTT (A.)—*Maladies fœtales qui peuvent faire obstacle à l'accouchement.* Thesis, p. 249. Paris, 1878.
39. SCHUTZ (E.)—*Prag. med. Wochenschr.*, Nos. 45 and 46. 1878.
40. JACKESCH (W.)—*Centralbl. für Gynäkologie*, Bd. ii. p. 619. 1878.
41. KLEBS.—*Prag. med. Wochenschr.*, Nos. 49 to 52. 1878.
42. MACDONALD (A.)—*Edinburgh Med. Journal*, vol. xxiv. p. 838. 1878.
43. POTT (R.)—"Ein Beitrag zu den Bildungsfehlern und fœtalen Erkrankungen des Herzens," *Jahrb. für Kinderheilkunde*, Bd. 13, p. 11. Leipzig, 1879.
44. FRANCK (L.)—"Zur Kenntniss der sogenannten Wasserkälber," *Deutsche Zeitschrift für Thiermedicin*, vol. v. p. 82. Leipzig, 1879.
45. STRAUCH (H.)—*Ueber fötalen Hydrops universalis.* Inaug. Dissertation. Berlin, 1880.
46. SIMPSON (A. R.)—*Edinburgh Med. Journal*, vol. xxvi. p. 164. 1880.
47. HABIT.—*Allgem. Wien Med. Zeitung*, xxv. p. 42. 1880.
48. BRAUN (C.)—*Lehrb. der Gesammt. Gynækologie*, p. 578. 1881.
49. AHLFELD (F.)—*Berichte und Arbeiten aus dem geburt-gyn. Klin. zu Giessen.* 1881-2.
50. BEHM (C.)—*Zeitschrift für Geburt. und Gyn.*, Bd. ix. p. 197. 1883.
51. RUGE (P.)—*Zeitschrift für Geburt. und Gyn.*, Bd. xiv. p. 208.
52. CHIARA (D.)—*Un Caso di anasarca del feto complicante il parto, Riforma Medica*, pp. 102 and 103. 1886.
53. TARNIER (S.) and BUDIN (P.)—*Traité de l'art des Accouchements*, vol. ii. p. 352. 1886.

54. HÖNCK (E.)—*Drei Fälle von allgemeinem fötalem Hydrops.* Inaug. Dissertation. Kiel, 1887.
55. BALLANTYNE (J. W.)—*Edinburgh Obstet. Soc. Trans.*, vol. xii. p. 161. 1887.
56. SÄNGER (M.)—*Archiv für Gynäkologie*, vol. xxxiii. p. 198. 1888.
57. PINZANI (E.)—"Considerazioni sopra un caso clinico di strana fragilità fetale," *Bullettino delle Scienze Mediche di Bologna*, vol. xxiv. pp. 5–23. 1889.
58. LOHLEIN (H.)—*Ueber Dystokie in Folge fötaler Hydropsie, Soc. Med., Giessen*, Nov. 12, 1889.
59. TARUFFI (C.)—*Storia della Teratologia*, P. I., tomo v. p. 327. 1889.
60. OSLER (W.)—"Congenital Affections of the Heart," Keatings' *Cyclop. of Diseases of Children*, vol. ii. p. 752. 1889.
61. COHN (E.)—"Ueber das Absterben des Fötus bei Nephritis der Mutter," *Zeitschrift für Geb. und Gyn.*, Bd. xiv. p. 587.
62. LONGAKER.—"Case of Diseased Placenta, Anasarca of Fœtus and Hydramnion," *American Journal of Obstetrics*, vol. xxii. p. 639. 1889.
63. GUENIOT.—"Dégénérescence Kystique des reins chez un fœtus hydropique," *Archives de Tocologie*, vol. xvii. p. 617. 1890.
64. FUHR (O.)—*Ein Fall von Anasarca des Fötus als Geburtshindernis.* Inaug. Dissertation. Giessen, 1891.
65. DARESTE (C.)—*La Production artificielle des Monstruosités*, p. 301, second edition. Paris, 1891.
66. BALLANTYNE (J. W.)—*Edinburgh Medical Journal*, vol. xxxviii. p. 57, 1892.
67. RAINERI (G.)—"Parto dystocico da feto generalmente edematoso," *Gazzetta Medica di Torino*, No. 2, p. 21. 1892.
68. BETSCHLER (J. W.)—"Zur Dystokie e fœtus hydrope anasarca gelatinoso," (first case), *Klin. Beitræge für Gynæk.*, Bd. i. p. 260. Breslau, 1862.
69. MATTERSDORF (G.)—*Allgemeines Oedem der Frucht und der Placenta.* Inaug. Dissertation. Breslau, 1891.

IV. GENERAL DROPSY IN THE TWIN FŒTUS.

I have reserved for separate consideration the dropsical fœtus born along with a healthy infant, for its characters appear to differ in a marked manner from those met with when the œdematous fœtus is the sole result of the pregnancy. Sometimes general dropsy is found in a twin developed within a separate chorion and with a separate placenta; but it is much more commonly met with in the monochorionic variety of plural births. The latter group will be considered first.

1. Cases of General Dropsy in the Monochorionic Twin.

In the case of monochorionic twins—*i.e.*, twins developed within one chorion and with one placenta—malformations are possible which would not in other circumstances be compatible with the continuance of intra-uterine life. Examples of such anomalies are found in the acardiac, acephalic, acormic, and anidean monstrosities. It is in these malformed fœtuses that dropsy in its most advanced and most deforming degree is found, and in them the enormous amount of œdema which exists is probably always due to cardiac and vascular anomalies.

Taruffi places all deformed monochorionic twins in one group, and names them *disomi omphalo-angiopaghi* (omphalo-angiopagous twins). This group may be said to correspond to that of the *allantoidal parasites* of Ahlfeld, and the characters of its members have been thus defined by Taruffi:—"Twins of the same sex, enclosed in one chorion, of which one offers more or less grave defects in development, and is in communication with the other, which is normally developed, by means of the vessels of the umbilical cord near the placenta." This method of grouping and this definition are useful, for they enable us to collect together those strangely aberrant monstrosities commonly described as acardiac, acephalic, and amorphic, and to understand their characters. The omphalo-angiopagous twin is very frequently the subject of a more or less general œdema, and this is true of all the three varieties into which this group of monstrous fœtuses has been divided.

The first variety of the omphalo-angiopagus is the *paracephalus*, with its sub-varieties, *dipus*, *apus*, and *pseudoacormus*. Of the paracephalus dipus there are again two kinds, the *paracephalus dipus cardiacus* and the *paracephalus dipus acardiacus*. The paracephali are defined as "omphalo-angiopagous twins, of which one has the head (cranium or face) and the extremities more or less defective; and sometimes with the absence of the lower limbs is associated also that of the trunk" (Taruffi). In the case of the p. dipus variety we have to do with twins of which one is certainly furnished with a head, a trunk, and lower extremities; but these parts are all more or less deformed, whilst the upper limbs are specially anomalous, and may even be absent. These fœtuses may have a heart, usually deformed (dipus cardiacus), or they may not possess this organ (dipus acardiacus).

It is an interesting fact, that all the cases of dropsy in the omphalo-angiopagous twin that have been recorded, with titles specially emphasizing the presence of the dropsy, seem to have belonged to the variety paracephalus dipus cardiacus. The reason is probably to be found in the fact that in the remaining varieties the other abnormalities were so evident as to make the existence of subcutaneous œdema appear to be a secondary and minor characteristic. In specimens of the paracephalus dipus cardiacus,

on the other hand, the most obvious external peculiarity was often the anasarca, and so observers were led to choose a descriptive title laying stress upon this condition. I shall here describe in detail only the cases belonging to the last-named class, for the others will be considered at another time.

The first case in which general dropsy was specially noted in a twin of the variety paracephalus dipus cardiacus, seems to have been that recorded by Louyse Bourgeois (1)[1] in the early years of the seventeenth century. This observer, who was the midwife of Marie de Medicis, and was born in 1564, described a confinement which took place at the seventh month, and resulted in the birth of twins, both females, of whom one was healthy and the other the subject of anasarca. It is impossible from the account given to say whether or not this was really an example of omphalo-angiopagous twins of the paracephalic variety, but it is extremely likely that it was.

The next specimen was that described first by A. Tamm, in 1857, in his inaugural dissertation, *De Hydrope Fœtus Anasarca;* and later by J. W. Betschler, in his communication entitled "Zur Dystokie e Fœtus Hydrope Anasarca" (Nos. 8 and 9).

The mother was 26 years of age, had begun to menstruate when 15, and had continued to do so regularly, and had always enjoyed good health. She was a iv.-para. Her first pregnancy had ended naturally in the birth of a male child; in her second, abortion took place; and her third went to the full term, when a female infant was born in a normal way. She was quite able to nurse her children.

Her present pregnancy, the fourth, had reached the seventh month when labour set in. She had first felt movement in the fifth month, and had noticed that her abdomen was much larger than in previous pregnancies, but she had observed no signs indicating death of the fœtus. Labour pains were strong, and after they had lasted during a whole night, the waters came away and uterine contractions ceased. The midwife in attendance then found that the head was not presenting, and sent for help to the Obstetric Polyclinique. The presentation was discovered to be a shoulder, and the right arm was lying in the vagina. Soon afterwards the pains returned, and a well-formed but dead female fœtus was born by spontaneous evolution, or *partus conduplicato corpore.* It was a seven months' infant, and had evidently died during labour. Immediately after the birth of this child it was observed that the mother's abdomen remained unusually large, and an examination revealed the presence of a second fœtus presenting by the feet. Traction did not serve to complete the labour, and it was found that there was distension of the fœtal abdomen. Before, however, instruments for the performance of paracentesis could be obtained, the second infant was expelled by the natural efforts (about one hour after the birth of the first). The medical

[1] The figures within parentheses refer to bibliography at end of article.

men in attendance could scarcely at first believe that they had to do with a real infant, so deformed was it. The placenta soon separated and was easily removed, and the mother made a rapid and complete return to her former healthy state.

The twins were both females; but the first born was, save for the signs of prematurity, normal in appearance, whilst the second was greatly deformed. It measured 33 cms. in length, and weighed fully 8 lbs. The head and trunk were three times as large as the lower limbs. Whilst there was a slight indication of a neck, the thorax and abdomen seemed to form a continuous whole. The right half of the head and the left half of the body were larger than the parts on the opposite side.

The head was like that of an uhu (eagle-owl), and was chiefly made up of three large projections, containing fluid, two laterally placed, and one in the centre above the nose. The eyes were hidden from view, and the nose and mouth lay in the median depression between the projections. On the left side of the trunk was a claw-like rudiment of the upper extremity with two fingers, but on the right side was no indication of an arm or hand. The thorax and abdomen formed a large tumour, trapezoid in shape as seen from the front. In the umbilical region was a fissure in the integuments, from the lower part of which protruded the greatly swollen umbilical cord. The external genital organs were normal. The lower limbs were not affected with anasarca, and were in consequence small in size when compared with the trunk and head. The left foot had two toes and the right only one.

The skin of the trunk and lower limbs had a reddish colour, as had also that of the head projections; the rest of the skin of the head was yellowish. Here and there the integument was glossy. The subcutaneous tissue of the head and trunk was so thickened by the dropsical anasarca as to measure at some places 1½ inch. Incisions in it allowed not a limpid, but an almost coagulated fluid to escape. The muscles were soft and infiltrated with serum. There was a meningocele at the root of the nose, and both internal and external hydrocephalus; the lateral ventricles contained much clear fluid, and the brain substance was greatly diminished. There was some fluid in the thoracic cavity, and whilst the heart and thymus were normal, the lungs were very small and compressed. The trachea and œsophagus ended blindly about the level of the second dorsal vertebra. The abdomen contained a large quantity of fluid, several of the viscera were too small, and were infiltrated with serum. The intestines were narrow, and contained much fluid. The urethra and ureters were pervious.

There was one well-formed placenta, near the centre of which both cords were inserted. In the small space intervening between the two insertions, a vein was seen passing from the vein of the one umbilical cord to that of the other. The cords were 2 feet in length, and on the vein of that belonging to the dropsical fœtus,

about 3 inches from the umbilicus, were three twists, in which were thrombi, producing a narrowed lumen, and the signs of phlebitis were present.

W. Nieberding, in his work on the origin of hydramnios (16), recorded a case of general dropsy in a twin fœtus.

The mother's pregnancy was interrupted at the end of the sixth month, and uniovular twins were born. No cause for the premature labour was to be found in either the mother or father, who were free from any trace of syphilis.

The twins, which were females, differed in size. "The larger one showed accumulations of fluid in its body cavities, and was also the subject of general anasarca. The heart and kidneys were considerably hypertrophied, and all the organs were infiltrated with numerous white and red blood corpuscles. There was dilatation of the urinary tubules, and the bladder was distended with urine; but the urethra was quite pervious. The cardiac hypertrophy was specially on the left side. There were also important changes in the ductus arteriosus: there was such an increase in the thickness of its muscularis and intima that near to the pulmonary artery its lumen was nearly obliterated. There was, therefore, premature obliteration of the ductus arteriosus. The smaller fœtus showed no anomalies save a certain amount of hyperæmia of the intestines."

The placenta was single, and had an elliptical form. The part of it which served to nourish the dropsical fœtus was of considerable size and thickness; its tissue was looser in structure than that of the other part, and it was to a large degree infiltrated with serum. Only one of the two amniotic sacs, that in which lay the dropsical fœtus, contained such a large quantity of liquor amnii as to constitute hydramnios.

In 1889 Smith and Birmingham (18) reported a case of œdema in a twin fœtus that was probably of the monochorionic variety; but in the absence of any account of the after-birth, it is impossible to be certain on this point.

The mother was a healthy woman, and had a good family history. The twins were males, and were born at the twentieth week of pregnancy. Whilst one was normal in appearance, the other was greatly deformed by œdema, and was about three times as large as its brother.

The œdematous fœtus was likened "to two large tomatoes strung together, one being represented by the head, the other by the body, and this resemblance was enhanced by the peculiar pinkish colour of the skin." The skin was raised all over the body by an infiltration of the subcutaneous tissue, with a glairy fluid like white of egg. In parts this tissue was three-quarters of an inch in thickness as compared with 1-50th of an inch in the healthy fœtus. So great was the œdema of the scalp, that the cranial bones could not be felt. "The head was made up of a number of puffy

swellings, separated by deep sulci. . . . These sulci were natural depressions, which were made sulci, sometimes half an inch in depth, by the enormous œdematous distension of the subcutaneous tissue in the intervals between the depressions." In the region of the face the eyes were hidden altogether from view, and only found after considerable dissection had been made. "The muscles and other tissues of the body which contain much areolar tissue were also markedly œdematous." There was no trace of the thoracic duct either in the thorax or at the root of the neck; the receptaculum chyli was absent; and no mesenteric glands were to be found even on microscopic examination. The heart, the thoracic bloodvessels, the thyroid gland, and other organs were normal. Under the microscope the skin and subcutaneous tissue showed numerous large spaces, some empty, others filled with a colloid material regarded as coagulated lymph.

The authors above named were those who specially emphasized the presence of general dropsy in monochorionic twins; but many other writers incidentally mentioned its presence in deformed fœtuses of this kind. Uccelli, in 1832 (5), described an omphalo-angiopagous twin of the variety paracephalous dipus cardiacus, which appeared to be little more than a shapeless mass of flesh infiltrated with serum; Metzner (6) noted that in one fœtus from a case of triplets there was enormous œdema; and Vrolik (7), in 1855, related the case of a greatly deformed twin that had great subcutaneous œdema, accompanied by cyst formations. There were in all these cases grave structural defects, but a deformed heart was always present.

In the other varieties of the paracephalic twin fœtus œdema was often found, and it was specially mentioned by C. Breus (15), in his description of a case of paracephalus dipus acardiacus. Some older writers also noted its presence in this variety of monster, *e.g.*, Curtius (3) and Borgnoni (4).

When the descriptions of *acephalic* fœtuses are studied, it becomes evident that in them also subcutaneous œdema is a striking character. Of these curious monsters, which are usually composed of a more or less defective trunk with a pelvis and lower limbs, but with no head and with in some cases no heart, many examples of general dropsy might be quoted; but it will suffice to mention two, one described by A. R. Simpson in 1877 (14), and the other by Routh in 1891 (19). In Simpson's case, an acephalus pseudo-acormus, to adopt Taruffi's nomenclature, it is stated in the report that "the subcutaneous cellular tissue was remarkably œdematous, so that in making the dissection it was constantly necessary to wipe the cut surface with a sponge." In Routh's specimen, which seems to have been one of acephalus thorus acardiacus, there was "extreme œdema of the subcutaneous connective tissue."

In the third group of omphalo-angiopagous twins, to which the general name of *amorphic* has been given, general dropsy is not

uncommon. This group contains two sub-groups, one containing the *mylacephalic* fœtuses, which are like uterine moles; and the other the *anidean*, which are without any specific form. Specimens showing general œdema have been described in both these sub-groups. Sangalli (13), for example, has put on record a mylacephalic twin in which the subcutaneous tissue showed numerous cavities containing serum; whilst Cornil and Causit (10), and Elb and Credé (11 and 12), have reported anidean fœtuses in which there lay under the skin a cellular tissue layer greatly infiltrated with serum.

Cases of General Dropsy in the Dichorionic Twin.

If the cases of Bourgeois and of Smith and Birmingham be regarded as examples of dropsy in one of monochorionic twins, an examination of the literature of the subject reveals only two cases in which in a plural conception a fœtus lying in a separate chorion or having a separate placenta was affected with general œdema. I have been able to find no case in the human subject recorded in which both twins, whether of the monochorionic or of the dichorionic variety, were dropsical.

With regard to one of the two cases above referred to a short note is found in Tarnier and Budin's *Text-book of Midwifery* (17). It is there stated that Budin had seen a case of twin pregnancy in which one fœtus was affected with general dropsy; there existed two distinct bags of membranes; and only the membranes of the œdematous fœtus were infiltrated with serum.

G. Bianchi (2), about the middle of the last century, reported with some fulness a very interesting case of dropsy in a plural conception. In 1758, wrote Bianchi, a woman of Rimini was confined of triplets at the fifth month of pregnancy. The first born was wrapped up in its own secundines, was of the male sex, and had a head and neck not recognisable on account of enormous œdema. After allowing the fluid to escape it appeared as if the head was cyclopic, for there was one large orbit lying above the nose, containing one eye without any eyelids; but near the right ear another eye smaller than the first was recognised. The lower jaw was entirely absent and the upper was deformed. Of the external ears only the vestiges were to be seen. The brain was distended with dropsy. The sternum was represented by a membrane; the larynx and tongue were absent; but the clavicles and scapulæ were present. The lungs had the appearance of two glands between which lay the shapeless heart. There was no trace of thymus gland or of diaphragm. The stomach was evident, and at its left side were two rounded somewhat obscure bodies which Bianchi suspected were the liver and spleen. The intestines appeared normal, as did also the penis, but there was no trace of a scrotum. The right arm was wanting, but the scapula and two boneless fingers were found. The left arm and the feet (contorted)

had also only two digits. The other two fœtuses were well formed and were born alive; one was a male and the other a female.

Clinical History.

Such were the cases of general dropsy in the twin fœtus that were from time to time put on record, and we have now to consider whether in their clinical histories they presented features in common or not. It may at once be stated that most writers have given a very imperfect account of the clinical details of these cases, their attention apparently having been directed entirely to the description of the various curious malformations that the dropsical fœtus usually exhibited.

A. *Age of Mother.*—In only five out of the seventeen cases that have been described was the age of the mother stated. In one case it was 20 (14); in another 24 (10); in another 26 (8); in Sangalli's case it was 32 (13); and in that referred to by Elb and Credé it was as much as 45 (11 and 12). In the majority of these cases, therefore, the patient was less than thirty years of age; in cases of dropsy in the single fœtus, on the contrary, by far the greater number of mothers was over thirty.

B. *Previous General Health, etc.*—In four cases (9, 10, 16, 18) the previous maternal health was mentioned, and in all it was good, although in one (10) it was noted that the woman was not robust. There was no record of syphilis.

C. *Sexual History.*—With regard to the number of past pregnancies, in two cases the patient was said to be multiparous (12, 19); in one (24) she was a i.-para; in one (20), a iii.-para, the previous children having been well formed; in one (9), a iv.-para, two full-term healthy children and one abortion; in one (7), a v.-para, having had four healthy children by a previous husband; and in one (13) an viii.-para.

The pregnancy which resulted in the birth of twins (or of triplets in Nos. 2 and 6), of whom one was dropsical, usually came to an end before the full term. In one case (18) it ended at the twentieth week; in one (2), at the fifth month; in one (16), at the sixth month; in two (1 and 9), at the seventh month; in two (4 and 7), at the eighth month; and in three (10, 12, 14), at the full term. In most cases the mother enjoyed good health during the pregnancy; but in one (12) there was some bleeding, and in another (10) there was grave hysteria during the last month. Sometimes the large size of the abdomen was noted, as in No. 9. In no case was there a record of maternal dropsy or of albuminuria. In one case (16) there was hydramnios, affecting, however, only one amniotic sac, that containing the dropsical fœtus.

In all the cases except two the labour ended in the birth of twins (1, 3, 4, 5, 7, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19); in the two cases, Nos. 2 and 6, it resulted in triplets. In three cases (2,

4, and 19) the dropsical fœtus was born first; in six cases (7, 9, 10, 12, 14, and 15) it was expelled after the normal child; and in the other eight cases it was either said to have been born at the same time, or else no reference was made to the fact at all.

In most cases it was not possible to learn what the presentation was, either because the fœtus was too much deformed, or else because it was very small and escaped notice till the birth of the placenta; but in the case of the specimen described by Tamm and Betschler (9, 10) it was a footling presentation. In most cases the labour was perfectly easy; but in one (10) it was tedious, although not instrumental. The third stage was usually quite normal, and the mother made, as a rule, a speedy recovery. In one case, however, a mole was expelled on the fifth day of the puerperium.

D. *Medical History of the Father.*—In two cases reference was made to the health of the father; in one (16) it was described as good, in the other (10) it was said that the father was not robust, but still enjoyed good health, and that his mother suffered from cancer. In one instance (7) a woman had healthy infants by a first husband, and a dropsical and deformed one by her second.

E. *Clinical History of the Infant.*—In every case the dropsical fœtus was still-born. In some cases (6, 10, 14, 17) the sex of the fœtus was doubtful or not stated; but in six cases (1, 4, 9, 15, 16, 19) it was a female, and in seven instances (2, 3, 5, 7, 12, 13, 18) it was a male. It was usually of the same sex as the normal infant; both were females in Nos. 1, 4, 9, 15, 16, and 19, and both were males in Nos. 3, 5, 12, 13, and 18. In No. 7 the dropsical monster was a male, the normal twin a female. In No. 2, the case of triplets, the morbid fœtus was a male, whilst the healthy infants were a male and a female. In the instances in which the sex of the dropsical fœtus was doubtful, that of the normal infant was in one case (10) masculine, in the other (14) feminine. In several cases the normal twin was born alive (1, 10, 12, 14, 15); in No. 19 it was very small, and lived only three days; in No. 9 it died in labour from the mal-presentation; and in No. 2 the other two fœtuses, although born alive, were not viable.

In the other cases the co-twin was either born dead (3 and 16) or was not viable (18), whilst in Nos. 3, 5, 6, 7, 13, and 17 its fate was not stated.

It will have been gathered from what has been said that the clinical histories differed within very wide limits, and did not present that amount of uniformity met with in the case of mothers of single dropsical fœtuses.

Pathology.

The morbid anatomy of both the fœtus and its placenta and cord has in some cases (3, 8, 9, 16, 18) been already given, and in the

other instances the malformations were so numerous that it is not convenient here to state them all; but certain general pathological details may be mentioned.

A. Morbid Anatomy of the Fœtus.

With regard to its *weight* and *size*, the dropsical twin was generally much smaller than the healthy infant; but in a few cases (9, 16, and 18), in all of which it belonged to the variety paracephalus dipus cardiacus, it was considerably larger. Thus in No. 9, although only a seven months' fœtus, it weighed 8 lbs., and was 33 cms. long; in No. 16 it was larger than the normal twin; and in No. 18 it was three times as large as its twin-brother. In the other specimens the small size of the œdematous twin was due to the gross malformations that existed.

In all the specimens *subcutaneous œdema* was a very marked character. The anasarca was usually general; but in No. 9 it did not affect the lower limbs. In most cases the œdema was described as serous; but in No. 9 it was called gelatinous, and in No. 18 glairy, like white of egg. Sometimes there were cysts containing serum situated on the surface of the skin (4, 7, 15). The great thickness of the subcutaneous tissue was frequently alluded to, and the œdema was described as "enormous," "great," "extraordinary," or "extreme." Friability of the tissues was not noted.

In some cases there were fluid effusions elsewhere in the body. Hydrocephalus was comparatively common (2, 4, 5, 7, and 9), and in Nos. 9 and 16 there was fluid in all the body-cavities. But dropsical collections in the thorax and abdomen were not so common in the twin as in the single fœtus.

With regard to the *pathological appearances of the viscera* the greatest variety existed. In some specimens, as No. 9, nearly all the organs were present; whilst in others, as No. 14, scarcely any were to be found. The cases which deviated least from the normal were the twins of the variety paracephalus dipus cardiacus (5, 6, 7, 9, and 16); whilst the greatest abnormalities were found in the acardiac, acephalic, and amorphous fœtuses (3, 4, 10, 11, 13, 14, 15, and 19). From an etiological point of view the most interesting anomalies were the premature obliteration of the ductus arteriosus in No. 16, and the absence of the thoracic duct and lymphatic vessels in No. 18.

B. Morbid Anatomy of the Placenta.

In the dichorionic twin the placenta was separate, and in one case (17) it was noted that the membranes of the dropsical fœtus alone were œdematous.

In the case of monochorionic twins, one of which was dropsical, there was only one placenta and one chorion. The placenta was usually described as large, once as elliptical (16), and in the same instance the part of it which nourished the dropsical twin was

œdematous. The amniotic sacs were usually separate, and in No. 16 there was excess of liquor amnii in the sac that contained the dropsical fœtus. In the advanced degrees of malformation the relations of the fœtal annexa were not easily made out, acardiac and amorphic fœtuses appearing to be little more than placental parasites.

Anomalies of the umbilical cord were often noted. In No. 5 the cord of the dropsical fœtus seemed to spring from that of the normal one; in No. 10 there was no true cord for the deformed twin at all; there was a cord with one artery and one vein in Nos. 7, 12, and 13; and in Nos. 9 and 15 there was an anastomosis between the vessels of the two cords. In one case also (9) it was specially noted that there were three twists on the umbilical vein containing thrombi, and that signs of phlebitis were present.

Etiology and Pathogenesis.

The causation of general dropsy in a twin is as a rule a simpler matter than that of the same morbid process in a single fœtus. Both the clinical history of the mother and the pathological anatomy of the fœtus lead us to look for a cause not in the maternal but in the fœtal economy. For the clinical histories that have been related contained no notice of any such characteristic group of symptoms as that met with in the case of mothers of a single dropsical fœtus, and the examination of the morbid infant's body usually revealed an adequate structural lesion to account for the dropsy. Further, the fact that one fœtus was dropsical and the other healthy, in itself suggests that the anasarca was not due to any pathological state of the mother, but to some defect in the fœtus or its annexa.

In one group of cases (Nos. 3, 4, 10, 12, 13, 14, 15, 19), that containing such advanced forms of monstrosity as the acardiac, acephalic, mylacephalic, and anidean fœtus, the cause of the anasarca is not difficult to discover. These fœtuses are truly parasites upon the normal infants along with which they are born. The heart of the healthy fœtus has not only to propel the blood through its own body but also through that of the acardiac parasite; but the circulation in the parasite being the more distant will be carried on with greater difficulty, stasis and exudation will take place, and dropsy of a very advanced degree will soon follow. The absence, therefore, of a heart, at any rate of a functionally active heart, is the cause of the anasarca in these greatly deformed twin fœtuses.

The heart, however, as has been shown, is not always absent or functionally useless in the dropsical twin. In case 9, for instance, the heart was normal. It is necessary, therefore, to look more closely for the cause of the anasarca in such cases. In connexion with his second case of general fœtal dropsy (No. 9) Betschler pointed out that the widespread character of the œdema, the

presence of effusions in the body-cavities, and the accompanying malformations, all indicated a very early date of origin and a very deeply established derangement of nutrition. He found that the lumen of the umbilical vein was diminished by the presence in it of thrombi and by the twists that it made round the arteries; there was, therefore, an inevitable restriction of the conveyance of blood to the fœtus, with, as a consequence, dropsy and the various malformations. Betschler thought that the cause of the anomalous condition of the umbilical vein was to be found in the presence of the little connecting vein joining together the umbilical veins of the two fœtuses. Blood flowing from the placenta to the umbilical veins must penetrate into the connecting vein, and that from two opposite directions. "If now these two vessels were of entirely similar character, if they were connected with the corresponding orifices of the communicating vein in an entirely similar way, and especially with quite equal angles, if, further, both orifices lay equally high, if, in a word, these relations on each side quite agreed and corresponded, then the impulse also of the blood rushing from each umbilical vein into this communicating vessel would act with quite equal force, and the blood-waves passing towards its middle point would there experience an obstruction, and would either stagnate or flow back to the parent trunks. Since, however, such a perfect equality of mutual relations could scarcely at any time occur, the impulse of the stream of blood advancing from the side favoured by the difference will overcome the one encountering it and drive it back into its umbilical vein. . . . In a word, an unequal conveyance of blood to the twins arises, and the one is nourished and developed at the cost of the other." Betschler's explanation no doubt applies also to other cases, *e.g.*, No. 5; but Nieberding found that in his specimen (16) another cause existed. The hypertrophy of the heart, the enlargement and congestion of the kidneys, the dilatation of the bladder, the cavity-dropsies, and the anasarca, he ascribed to early obliteration of the ductus arteriosus due to an increase in its muscular and internal layers. The result of this premature closure would be obstruction in the venous system, an increased flow of blood through the foramen ovale into the left heart, an hypertrophy thereof with increase in the blood-pressure in the arterial system. The venous obstruction would cause the dropsical states, and, through the umbilical vein, œdema of the placenta; whilst the increased arterial pressure due to cardiac hypertrophy would lead to increased filtration through the kidneys, diuresis, with dilatation of the urinary bladder and hydramnios. Whether all the details of Nieberding's explanation are right may be doubted, but it seems probable that the cause of the dropsy was as he stated it.

Smith and Birmingham (18) found yet another explanation of the universal dropsy which existed in their specimen, namely, the

absence of the thoracic duct and lymphatics. In their fœtus "every portion of the connexion between the lymph-spaces of the tissues and the venous trunks was absent,—thoracic ducts, lymphatic glands and vessels; the exuded liquor sanguinis possibly, to a slight extent, found its way back to the blood through the agency of the small veins; but if this were the case, the compensation was not sufficient, the exudation went on, the drainage of the spaces was deficient, the spaces became enormously distended, and the result was the aggravated condition of œdema already described." What were the causes of this want of development of the lymphatic system must remain, for the present at least, a mystery.

General dropsy in the twin fœtus may then be ascribed to absence or anomaly of the heart, of part of the vascular system, or of the lymphatic system. Its etiology is essentially fœtal, and differs from that of dropsy of the single fœtus, which is probably both maternal and fœtal. It would be interesting to analyse the dropsical effusions in twin fœtuses in order to see whether or not they have the chemical characters of obstruction-effusions. From their naked-eye appearances it is probable that they have.

Literature.

1. Bourgeois (Louyse).—*Lib. Obstet.* i., c. 43, p. 163. About 1605.
2. Bianchi (G.)—*Dissertationes habitæ in Academia medica, quæ Mutinæ est. Nuova raccolta d'Opuscoli scientifici*, tom. v. p. 7. Venezia, 1759.
3. Curtius (C. W.)—*De monstro humano cum infante gemello.* Diss. Lugd. Batav. 1762.
4. Borgnoni (G.)—*Parto gemello mostruoso. Opusc. Fossombrone*, 1806.
5. Uccelli (F.)—*Anno di clinica esterna*, vol. ii. p. 211. Florence, 1823.
6. Metzner.—*De casu singulari partus trigemini.* Inaug. Diss. Halle, 1851.
7. Vrolik.—*Beschryving eeniger merkwardige Missgeborten.* Amsterdam, 1855. (Full abstract in Taruffi's *Storia della Teratologia*, tom. iv. p. 137, 1882).
8. Tamm (Adamus).—*De Hydrope Fœtus Anasarca, subjuncto casu memorabili in Policlinico Gynæcologico Vratislaviensi observato.* Diss. Inaug., Vratislaviæ, 1857.
9. Betschler (J. W.)—"Zur Dystokie e Fœtus hydrope anasarca gelatinoso" (second case), *Klin. Beitræge für Gynäk*, Bd. i. p. 260. Breslau, 1862.
10. Cornil et Causit.—*Gazette médicale de Paris*, vol. xxi. p. 388. 1866.

11. ELB.—*Ueber einen Fall. von Herzloser Missgeburt.* Diss., Leipzig, 1866.
12. CREDÉ.—*Monatsschrift fur Geburtskunde*, vol. xxxiii. p. 296. 1869.
13. SANGALLI (G.)—*La Scienza e la pratica dell' Anat. patol.*, p. 70. Pavia, 1875.
14. SIMPSON (A. R.)—*Edinburgh Medical Journal*, vol. xxiii. p. 46. 1877.
15. BREUS (C.)—*Wiener med. Jahrb.*, p. 57. 1881.
16. NIEBERDING (W.)—*Beitrag zur Kenntniss der Genese des Hydramnion, Festschrift*, Leipzig 1882; also in *Archiv für Gynäk*, vol. xx. p. 310. Berlin, 1882.
17. TARNIER (S.) and BUDIN (P.)—*Traité de l'art des accouchements*, vol. ii. p. 352. 1886.
18. SMITH (A.) and BIRMINGHAM (A.)—"Absent Thoracic Duct causing Œdema of a Fœtus," *Journal of Anatomy and Physiology*, vol. xxiii. p. 532. 1889.
19. ROUTH.—*London Obstetrical Society's Transactions*, vol. xxxii. p. 347. 1891.

Dr Brewis was sure the Society was greatly indebted to Dr Ballantyne for his interesting and valuable contribution. It was not a paper which one could criticise, but he congratulated Dr Ballantyne on the graphic manner in which he had handled the subject, and also on the excellent illustrations which he had sent round. The paper would enhance in a large measure the value of the *Transactions* of the Society.

Dr P. Strassmann (*Berlin*) remarked that he had observed in Giessen a case of *hydrops fœtus universalis* with hydramnios, where the post-mortem examination showed a great *hernia diaphragmatica*, the lungs being quite compressed. The woman had borne malformed children several times, some of them also with symptoms of dropsy. The seventh pregnancy was the above mentioned; the eighth resulted in abortion of a *mola hydatidosa* at the end of the third month. There was no syphilitic history either of the mother or the father, the latter being a chronic alcoholist. The diagnosis in those cases, where the head is already born, is not so easy, but can be ascertained by exploration under narcosis with four fingers. The attempts to extract the body of the fœtus might result in tearing of the dropsical parts; therefore the fœtus having no chance of life, it was the best plan to tap the ascites if the delivery gave any difficulty.

Dr J. W. Ballantyne felt that he ought not to delay the Society longer after the attentive hearing they had accorded to his somewhat lengthy communication. He was interested to hear an account of Lohlein's cases from the lips of an eye-witness (Dr Strassmann), and had been struck by the close resemblance of that case to his own. He hoped to bring forward some cases of localized dropsy of the fœtus at a future meeting.

VI. CASE OF PARTIAL OBLITERATION OF THE GALL-BLADDER IN A NEW-BORN INFANT, ASSOCIATED WITH NUMEROUS OTHER CONGENITAL MALFORMATIONS.

By JOHN THOMSON, M.D., F.R.C.P.E., Extra-Physician to the Royal Hospital for Sick Children; Lecturer on Diseases of Children, School of Medicine, Edinburgh.

FOR the opportunity of examining and reporting the following case, I am indebted to my friend Dr T. J. Thyne, by whom I was asked to see the child. The infant was born on the evening of January 13, 1892.

Family History.—The mother (Mrs R.) is a strong, healthy-looking woman, and this is her fifteenth child. Nine of her former children are alive and healthy, and five have died from various ordinary complaints. None of the family have, so far as can be ascertained, suffered from any congenital malformation or disease, and there is no history of syphilis and no reason to suspect it.

Pregnancy.—The mother says that when she was about one month pregnant she got a very great fright from a cat, with a kitten in its mouth, suddenly jumping through the glass of the window into her room. The fright made her feel ill at the time and for some days after.

The birth was normal, but was thought to be about a month premature. There was an unusually large amount of liquor amnii.

After birth, the infant was noticed to be deeply cyanosed, and its extremities were swollen (œdematous). On auscultation, a loud, harsh, systolic murmur was heard by Dr Thyne all over the front of the chest. A quantity of normal meconium was passed. There was no jaundice. The child got rapidly weaker, and he died at 2 P.M. on January 14, shortly before I saw him.

Post-mortem Examination, 15th January:—

External Inspection.—The child is small, and, from his general appearance and the state of his nails, would seem to be more than one month premature. The body presents the following abnormalities:—

1. The whole of the right external ear, with the exception of the lower part of the lobule, is adherent to the adjacent scalp. The left ear, though poorly formed, is not specially abnormal.

2. There is harelip on the right side, extending into the nostril and communicating with

3. A complete cleft of the hard and soft palates.

4. There is a curious abnormality of both hands. The bones of the hands and fingers are normal in number and size; but the index finger stands apart from the medius—parallel with the thumb—as if opposing the other fingers along with the thumb.

As far as can be made out without dissection of the hand, the articular surface of the metacarpal bone of the index finger must be abnormal in direction. Both the index and medius seem incapable of complete extension. There is no corresponding abnormality of the feet.

The scrotum is empty, but otherwise the external genitals are normal.

Thorax well formed. Thymus large; pleuræ and pericardium normal, containing no fluid; lungs normal and well expanded.

The heart and great vessels present the following abnormalities:—

1. The latter have a completely fœtal conformation. The ductus arteriosus is very wide (about ½ inch internal diameter). The aorta is very slightly narrowed before the ductus joins it; there is no narrowing of the pulmonary artery.

2. The pulmonary and aortic orifices are each provided with only two semilunar valves. These are normal in texture, and seem to close the orifices satisfactorily.

3. There is an oval opening in the upper part of the interventricular septum, measuring ⅝ × ½ inch.

The auriculo-ventricular valves appear normal, and the foramen ovale is closed by a loose membrane which, besides showing the usual opening at its upper part, has numerous small apertures in it. The thickness of the wall of the right ventricle is to that of the left as 2 to 3.

Abdomen.—No trace of peritonitis visible.

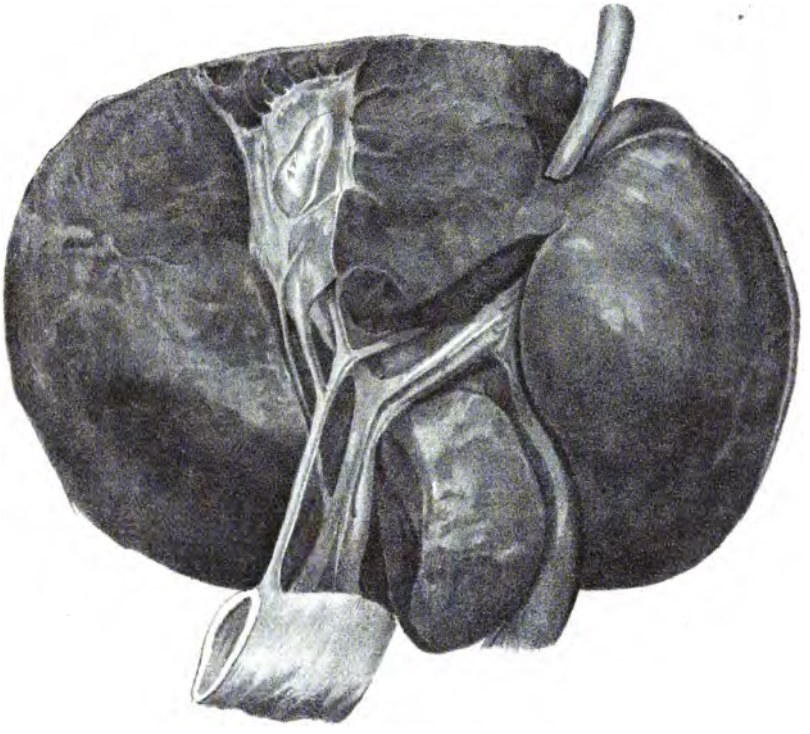
Liver (see Plate[1]) appears normal in size (weight 2 oz.), and is very dark in colour and congested.

The gall-bladder is very small—about half-an-inch in length. It is embedded in a mass of white cicatricial tissue. On further dissection, it is found that its walls are very much thickened, and its lumen very small and somewhat stellate in shape. It contains a few drops of thin yellow fluid. Its posterior end and the anterior third or so of the cystic duct are entirely obliterated.

The posterior two-thirds of the cystic duct, and the hepatic and common ducts seem to have thickened walls and small lumina, but they are pervious. The bloodvessels supplying the gall-bladder are unusually large. The peritoneum covering the gall-bladder and adjacent parts is perfectly smooth and normal.

On microscopical examination, the thickened wall of the gall-bladder is found to have a fibro-cellular structure resembling that of granulation-tissue. It is lined by normal-looking columnar epithelium, and, in its substance, there are some small cysts, lined by similar epithelium, which look like dilated mucous glands. The obliterated part of the gall-bladder shows the same fibro-cellular structure, with cysts like dilated acini, but has no trace of a lumen. The connective tissue in which the gall-bladder is

[1] The drawing is one and a half times the natural size.



Congenital Obliteration of the Gall Bladder.

Wm CATHIE LITH

embedded seems to consist of a great hypertrophy of that usually surrounding the organ. It contains some very large blood-vessels.

The liver-tissue shows a slight increase of leucocytes in the portal spaces.[1]

Nothing abnormal is noticed about the intestines. The papilla of the ductus communis is normal and patent. The large bowel is filled with normal-looking meconium. There are some enlarged mesenteric glands.

The spleen is a little larger than natural and is dark in colour, but otherwise normal.

The kidneys are irregular in shape, and are united to one another below for about ¾ of an inch, forming a "horse-shoe kidney." The ureters come off from the anterior surface of the kidneys. The adrenals are normal in size and shape.

The bladder is normal, as are also the testicles, which are situated at the brim of the pelvis.

Remarks.—This case is of considerable interest, because the condition of the gall-bladder found in it is evidently due to the disease which produces "congenital obliteration of the bile-ducts;"[2] and some of the other facts of the case may help to throw light on the somewhat obscure subject of the etiology of that condition.

The present writer has already (p. 44 *et seq.*) attempted to prove that the inflammatory process which is the immediate cause of the malformation in these cases has nothing whatever to do with syphilis (as is usually taken for granted), but is, probably always, secondary in some unexplained way to a developmental abnormality.

This case affords strong confirmation of that view. For, on the one hand, we find that there is no history of syphilis in the parents; that they have had fourteen previous children without a sign of it; and that the child itself presents no appearance in any other organ that could be held to be due to syphilis. . While, on the other, the numerous developmental abnormalities, both internal and external, certainly afford strong presumptive evidence in favour of the malformation of the gall-bladder being of the same nature.

The fact of the epithelium lining the gall-bladder being normal and healthy-looking (and that of the bile-ducts also, so far as they were examined), seems to prove that the cause of the inflamma-

[1] A further examination of the minute anatomy of the liver and ducts in this case has been undertaken by Dr R. Muir, and will be published on another occasion.

[2] In several of the cases of congenital obliteration of the bile-ducts which have been recorded, the gall-bladder is described as being in very much the same condition as in this case. See, for example, Lotze, *Berliner klin. Wochenschrift*, 1876, No. 30, p. 438; Freund, *Jahrb. f. Kinderheilk.*, ix., 1876, p. 406; E. Gessner, *Ueber congen. Verschluss der grossen Gallengänge*, Inaug. Diss., Halle, 1886.

tion cannot have consisted, as might have been suggested, in abnormal composition and consequently irritating properties of the bile.

MEETING V.—MARCH 9, 1892.

Professor A. R. SIMPSON, *President, in the Chair.*

I. *Dr Haultain* showed two specimens of DEVELOPMENTAL ANOMALIES OF THE FALLOPIAN TUBE. The first showed an absence of the abdominal opening, the end of the tube being quite smooth and resembling the finger of a glove. The mucosa of the tube was quite smooth, there being a total absence of the usual well-marked longitudinal folds; this, he thought, might have an important connexion with the want of the fimbriated extremity, as it was known that dehiscence of the tube probably took place along the grooves between these longitudinal folds, and the folds themselves formed the fimbriæ. The patient from whom the tube was removed was a multipara, the other tube was quite normal. The ovary on the same side as the undeveloped tube was the seat of a cyst the size of a walnut, the rest of the organ being cirrhotic. The second specimen was a transverse section of an evidently normal tube removed in Tait's operation for fibroid tumour. It showed, however, two distinct cavities, the lumen of each being surrounded by branching processes covered by columnar epithelium. The abdominal end of the tube was unfortunately lost—Dr Stiles, who cut the section for a physiological specimen, not having noticed the abnormal condition till it was examined under the microscope.

II. *Dr Cullen* showed a specimen of ANENCEPHALUS WITH SPINA BIFIDA. It was the product of an eighth pregnancy. There was nothing noteworthy with regard to the previous pregnancies or with regard to this one. The mother thought herself to be about the eighth month in the family way, when the waters broke suddenly one night when she was at rest in bed. A few slight pains came on after this. She was seen 40 minutes after rupture, when a coil of pulseless cord was found protruding at the vulva. The placenta was at the ostium vaginæ, and above it the two feet were felt. The os uteri had contracted pretty firmly over the thighs of the infant, and it was an hour before the child was born. The fœtus was a female, rather small, and apparently between eighth and ninth month. The bony vault of the skull was gone, and only a round mass the size of a tangerine orange, and quite soft, was present above the base of the skull. The fœtus had the typical anencephalic appearance, the head resting upon the shoulders without the intervention of a neck, and the ears being wedged in

on each side in the groove between the head and shoulder. There was, in addition to the anencephaly, a state of spina bifida, the neural arches being absent throughout the cervical, dorsal, and upper part of lumbar region. There was nothing abnormal in the condition of thoracic and abdominal organs, and there were no deformities of the extremities. The supra-renals were not to be found, but that may have been due to hasty dissection. In conclusion, it may be stated that the woman never suspected that there was anything abnormal in the fœtus, which she had felt moving about freely a few hours before the rupture of the membranes. The amount of liquor amnii was very great, so that, as is so frequently the case, the anencephaly was associated with hydramnios.

III. *Dr Church* showed, in connexion with his paper on "Thrombosis of the Pulmonary Arteries," a portion of LUNG with a decolorised clot in the pulmonary artery. Also another portion of the same LUNG where a branch of the pulmonary artery which had been dissected out was filled with a red clot. The cut surface of the clot in the main branch showed a portion of older clot on one side. The lung tissue was infiltrated with blood. He also showed an APPARATUS FOR INHALATION OF OXYGEN GAS, by means of which the gas could be inhaled by the mouth or nostril, diluted or undiluted with air. It consisted of a bladder, capable of holding about 1 cubic foot of oxygen, with stop-cock and tubing. Also the iron bottle in which oxygen was supplied in the concentrated form, from which the bladder could be from time to time filled as required.

IV. ON THE STRUCTURE OF THE HUMAN PLACENTA, WITH SPECIAL REFERENCE TO THE ORIGIN OF THE DECIDUA REFLEXA.

By D. BERRY HART, M.D., F.R.C.P.Ed., F.R.S.E., and G. LOVELL GULLAND, M.B., F.R.C.P.Ed.

IN investigating the structure of the advanced extra-uterine placenta, one of the authors was struck with the fact that the placenta developed there entirely in connective tissue. In the placenta of advanced normal gestation, it has been supposed by many good observers that the fœtal villi, in addition to their own epithelium, derived a covering from the maternal epithelium,—from the surface epithelium of the serotina, or from that of the uterine glands. The generally accepted view in regard to the human placenta has been that the villi of the fertilised ovum grafted themselves on a portion of the hypertrophied mucous membrane, this portion being now termed the decidua serotina; that by the mutual ingrowth of the serotina and villi the placenta

was formed; while round the developing ovum there very early grew coalescing folds of decidua, the so-called decidua reflexa. On the one hand were the chorionic villi covered by the fœtal epithelium, on the other the connective tissue of the serotina with its special layer of epithelium,—these forming, as it were, the elements from which the complex placenta was to evolve.

This view is highly unsatisfactory, so far as the human placenta is concerned. It does not explain the overwhelming frequency with which the human fertilised ovum grafts itself on a certain area of the genital tract, viz., in the uterine cavity proper; it assumes a function for the surface epithelium which has never been proved; and, finally, it leaves the origin of the decidua reflexa a complete mystery. Why should decidual folds at the edge of the serotina rise and cover in the ovum, however various its site within the normal limit?

The present investigation was therefore begun to ascertain the part played in the development of the human placenta by the surface epithelium of the decidua serotina; to discover, if possible, a feasible explanation of the overwhelming frequency with which the fertilised human ovum grafts itself in the cavity of the uterus proper; and, finally, to investigate the nature of the reflexa.

In approaching these questions, we found the greatest help in the invaluable monographs of Sir William Turner, *On the Comparative Anatomy of the Placenta.* The microscopic investigations of Hubrecht, Duval, Langhans, Kastschenko, Minot, Frommel, Gottschalk, and many others, gave us not only valuable facts, but enabled us to compare our own results with theirs.

One of the most important factors in such an investigation as the present is the material at the disposal of the workers, its freshness, and the methods employed for its preservation and examination. In the lower animals, as a rule, the specimen can be obtained immediately after the animal's death, and at once prepared for microscopic examinations in the best manner possible. In the case, however, of human uteri it is different, as the specimens are usually obtained from twenty-four to thirty-six hours after death, and thus their value is greatly deteriorated, especially as regards free mucous surfaces, where the epithelial covering soon becomes lost. The authors were specially fortunate in their specimens, as one early pregnant uterus, about the sixth or seventh week, was extirpated from a patient, owing to cancer of the vaginal portion of the cervix, and placed in corrosive sublimate solution a few minutes after its removal. A second specimen of a full-time pregnant uterus was re-obtained from a patient who died suddenly, and on whom post-mortem Cæsarean section was performed in the child's interest. The uterus was also removed at the same time, and very shortly afterwards hardened in corrosive sublimate and alcohol. The specimens examined were as follows:—

Rabbit.—(1), Unimpregnated uterus; (2), impregnated ovum at fourth day; (3), impregnated ovum at eighth; (4), impregnated ovum at eleventh; (5), impregnated ovum at fourteenth; (6), impregnated ovum at twentieth day; (7), placenta at full time; (8), post-partum uterus.

Sheep.—Unimpregnated uterus, and many very early pregnancies, the dates of which could not be ascertained.

Rat.—One near full time (white rat).

Human.—(1), Several early abortions; (2), six weeks' pregnant uterus in complete preservation; (3), two months' aborting uterus; (4 and 5), three months' pregnant uteri with fœtus expelled (two specimens); (6), four months' uterus; (7), four and a half months' uterus; (8), two sixth months' uteri; (9), full-time pregnancy; (10), two third-stage uteri (full time). All of these were in a good state of preservation, while 2, 8, and 9 were quite perfect.

The method of preparation employed varied in different cases. As fixing agents, Flemming's "strong" solution, a saturated watery solution of picric acid, and a watery solution of corrosive sublimate saturated by boiling, were used in different cases, and to control one another. The early rabbits' uteri were fixed, after cutting them into segments, either unopened in the case of the fourth day uteri, or in the eight days' uteri, after a window had been made in the side away from the mesometrium to allow the escape of the amniotic fluid and the entrance of the fixing agent. The later rabbits' uteri were all opened before fixing, as were also the sheep's, rat's, and human uteri. All the specimens were hardened in alcohol, and cut in paraffin, the smaller uteri and placentæ being cut in series. The sections were fixed on the slide by the method described by one of the authors (*Journal of Anatomy and Physiology*, 1891); stained, as a rule, with hæmatoxylin and eosin (though gentian violet, iodine green, and other anilines, were sometimes used), and mounted in balsam.

Results of Examination of Impregnated Ova of Rabbit, Rat, and Sheep.

We do not propose to give a detailed description of the appearances found in these placentæ. This will more appropriately appear at another time; for, while the pregnant uteri of these mammals present many interesting features, the structure of their placentæ differs too much from that of the human placenta to allow of any very profitable comparison. For example, the villi of the rabbit's placenta are totally unlike the human villi; the so-called decidua reflexa of the rat is merely a cup-shaped elevation in which the placenta lies, and though the villi of the sheep's placenta have some points of resemblance to those of the human chorion, the manner of their implantation, in specially differentiated parts of the uterine surface, is so unlike what takes place in the

human uterus, that it is doubtful how far one is entitled to institute a comparison.

The following points are the main ones which can be brought into line with facts in the history of the human placenta:—

Rabbit.—Here, as Duval, Minot, and others have already shown, the uterine epithelium becomes immensely hypertrophied and degenerated over the two folds of the mucosa next the mesometrium, the site of the future placenta. At that point on the circumference of the blastoderm, which comes in contact with these projecting folds, the fœtal ectoderm becomes thickened, and before the mesoderm has grown up to support it, it becomes attached to the degenerated uterine mucosa, which rapidly disappears before it (see Fig. 6); very possibly the degenerated epithelial cells are utilised for the nutrition of the "ectoplacenta," as Duval proposes to call this epiblastic proliferation. The mesoderm soon grows into the ectodermic projections, and villi of a sort are formed, but these differ so much from the villi of the human placenta that their history need not be further traced. We need only say that the ectoplacenta loses its distinctness very soon, and seems mainly to be employed to remove the superficial parts of the serotina, if we may so call it.

Rat.—The only point of special interest is the ease and completeness with which the decidual cells, which are here very large, can be shown to be derived from the ordinary connective-tissue corpuscles of the serotina. All intervening stages can be found in the layers of cells lining the so-called decidua reflexa. In other respects the placenta of the rat greatly resembles that of the rabbit, and is not further available for our present purpose.

Sheep.—Here the structure of the placenta is modified by pre-existence of the projections on the uterine wall, which combine with the fœtal parts to form the cotyledons. These projections, in the non-pregnant uterus, are low, round cylinders with a slightly excavated summit, and are irregularly scattered over the uterine mucous membrane. They consist of a delicate connective tissue whose strands run mainly parallel to the surface, and which is traversed by numbers of long capillaries running mainly at right angles to the surface. They are covered by a single layer of cubical epithelium, and there are no glands, though in the rest of the uterine mucous membrane these are numerous and well formed. When pregnancy occurs, the blastoderm very rapidly fills up the uterus, and on the parts applied to these projections the epiblast (which has usually two layers) and mesoblast simultaneously form villi, at first very short. The application of these to the surface of the uterine projections is soon followed by the degeneration and disappearance of the uterine epithelium; and the further history of the placenta, so far as we traced it, is comprised in the growth of the villi into the cotyledon and the disappearance of the connective tissue forming this before their growth. No special

decidual cells are formed, and the connective tissue does not show any marked appearances of degeneration before its removal. The villi retain their original character.

The only point in which the placentæ of the rabbit and sheep agree is in the way in which the uterine epithelium is removed by the fœtal epithelium. The uterine epithelium becomes absorbed or destroyed by the villi which then come in contact with the connective tissue of the mucous membrane. It is possible that the altered epithelium may have a nutritive function for the early ovum.

Human Pregnancy (Sixth Week).

(Fœtus one and a quarter inches long.)—As already explained, this specimen was exceptionally well preserved.

Decidua Vera.—Two portions were specially examined—(*a*) at the placental edge; (*b*) at the lower uterine segment.

(*a.*) *At the placental edge* there is an evident naked-eye division into a compact and a spongy layer. The thickness of the entire decidua is about a quarter of an inch, the compact layer about a twelfth, the spongy layer a sixth. The surface is covered with a single layer of columnar epithelium (see Fig. 11). The cells show no trace of cilia, and have the appearance of being somewhat degenerated, the intra-cellular network is swollen, giving the protoplasm a very granular appearance, while the nuclei, though here and there normal, are often irregular and angular in outline, and stained faintly with hæmatoxylin. The compact layer consists mainly of a felted mass of large decidual cells, whose diameter is generally from 18 to 30 μ, but which vary within even wider limits. Their nuclei are large, and are of a connective tissue type. Scattered among these are a certain number of leucocytes (not very many), and traversing the layer are numerous thin-walled blood-vessels, and the generally compressed ducts of the glands. The spongy layer is seen to be due to the persistence and dilatation of the uterine glands. The spaces formed in this way are very large (Fig. 1), and take up most of the layer, the trabeculæ of decidual tissue between being comparatively narrow. The epithelium lining these gland-spaces varies considerably in character; that lining the ducts and the spaces nearest to the compact layer is generally somewhat degenerated and flattened, the epithelium of the deeper spaces is cubical and more normal in appearance; while the epithelium of the gland-spaces close to the muscular coat is cylindrical, and is not distinguishable from that of the deep glands of the normal non-pregnant uterus. The spaces generally contain granular débris, degenerated epithelial cells, and leucocytes. In the interglandular tissue the large decidual cells are not so numerous as in the compact layer, and there are proportionately more leucocytes.

(*b.*) *At the lower uterine segment* the decidua is of about the same

thickness, but the compact layer is relatively much thicker, and contains fewer ducts, while the spongy layer is not nearly so well defined, nor are the glands so much dilated nor so numerous as at the edge of the placenta. The surface is covered by epithelium having the same characters as that at the placental edge.

DECIDUA REFLEXA.—At its origin where, including the chorionic villi embedded in it, the membrane is about a third of an inch in thickness, this has the same structure as the adjoining vera; it looks, indeed, as if the compact layer of a part of the decidua vera had been separated from the spongy layer below, and folded back so that the surface epithelium of the reflexa came in contact with that of the vera. Indeed, glands can be seen opening on the outer surface of the reflexa whose deeper expansions are to be found in the vera; the ducts are folded round at the junction just as the surface epithelium is. There are other glands opening on the outer surface of the reflexa, though not very many, whose fundi do not pass out of the reflexa; but these glands are never very long, and there is no trace of a spongy layer anywhere in the reflexa, nor do any glands open on the inner or fœtal surface of the reflexa. This surface is, of course, occupied by the chorionic villi at this stage, and the part of the decidua in contact with them has the structure of the compact layer, and presents appearances like that of the serotina at the point where the villi are pushing forward into it,—appearances which will presently be described.

The decidua reflexa retains this character for some distance, perhaps half an inch or so from its origin, but as it thins out over the ovum its structure alters. The surface epithelium is lost, all traces of glands disappear, the decidual cells become more and more degenerated, and are replaced ultimately by a fibrinous layer which contains immense numbers of leucocytes, most of which are also degenerated. Scattered through this layer are degenerated villi, denuded of epithelium and surrounded by a layer of fibrin. The villi close to the chorion are healthy much further up the decidua than the outlying ones are; but, at the very top, the reflexa consists only of a thin chorion of degenerated fœtal connective tissue, with no epithelial covering, and external to this a few strands of fibrinous-looking material with numbers of leucocytes.

PLACENTA.—For its examination sections were made from amnion to muscular coat, and in these there are to be seen from within out, amnion, chorion, chorionic villi, maternal portion of placenta, and muscular coat.

The *amnion* is from 30 to 60 μ in thickness, and made up of flattened epithelium with flattened nuclei on a basis of connective tissue.

The *chorion*, 0·1 to 0·2 mm. thick, is slightly separated from the amnion, but it is difficult to say whether this separation may not be partly artificial, as there seem here and there to be connective-tissue fibres running between the two. The connective tissue of

the chorion is of the usual type. The epithelium covering its outer surface varies from place to place along the main chorion. It is perhaps most usually a single layer of low cubical cells, but here and there are to be found two layers, when the appearances are the same as those about to be described in the terminal villi.

The *chorionic villi* are formed of ordinary fœtal connective tissue with bloodvessels running through it. The latter are not nearly so wide nor so numerous as they become towards the end of pregnancy. The special point of interest in regard to these villi is, however, their covering, which varies somewhat from place to place. Over the main villus-stems, as over the main chorion, there is often a single layer of cells, but in some places on these larger stems, and almost uniformly over the smaller villi, the epithelium consists of two, sometimes even of three, layers of cells (Figs. 2 and 5). The inner of these layers consists of cubical cells, with a large nucleus and relatively clear protoplasm; the outlines of the individual cells can usually be made out. The outer layer consists of cells more or less degenerated, the protoplasm is granular, and stains more deeply with eosin than that of the inner layer of cells, the outline of the cells can seldom be made out, the nuclei are smaller than those of the inner layer, stain deeply, and are often flattened or angular; there is, in short, every reason to regard this layer as one derived from proliferation of the inner layer. The ectoderm of the fœtus itself in this pregnancy has two layers, and presents appearances almost identical with that of the epithelium covering its villi. The villi of all parts of the placenta which were examined, and the undegenerated villi embedded in the decidua reflexa, all had this structure (except those villi which were embedded in a fibrinous mass, which will be described shortly), and in *none* of the dozens of sections systematically examined was there *any appearance which could give rise to the suspicion that the maternal epithelium had any part in forming the covering of the villi, or that there was anywhere an endothelial covering external to the epithelium.*

The *intervillous spaces* do not seem to contain blood in this specimen; near the chorion they seem indeed to be empty, while near the maternal part their only contents seem to be degenerated débris, apparently the remains of part of the decidua serotina. Here and there, in the part of the fœtal placenta next the maternal portion, are islets of this degenerated decidual tissue, in some of which villi are embedded, and these villi, as well as those which are here and there embedded in the surface of the decidua serotina and reflexa, are sometimes without any epithelial covering. The connective-tissue part of the villus is generally surrounded by a ring of fibrinous-looking material, probably the same as that whose origin from the epithelium Minot discusses at length.

There are also, in relation to many of the terminal villi, peculiar

masses of cells; which will, however, be more appropriately described after the decidua serotina has been discussed.

DECIDUA SEROTINA.—The portion of this layer which remains beneath the rapidly advancing fœtal placenta is only about half the thickness of the decidua vera, and, like it, can be divided into a compact and a spongy layer, with this difference, however, that whilst in the vera the spongy layer is twice as thick as the compact layer, in the serotina the compact layer is at least twice the thickness of the spongy layer, and contains hardly any glands or ducts; these are almost entirely confined to the spongy layer. The compact layer presents other differences from that of the vera; there are many large bloodvessels, apparently veins, in it, with more or less degenerated walls. In some cases the endothelium lining these degenerated vessels has begun to proliferate (Fig. 12), and in some of these thrombosed vessels the lumen is entirely taken up by young connective-tissue cells—a condition hitherto supposed to come on only after the eighth month of pregnancy (Friedländer, Leopold). The decidual cells present different characters in different parts of the serotina. Next the fœtal placenta they are like those of the decidua vera, but are almost always degenerated, *i.e.*, their nuclei stain faintly, the outline of the cells is more or less blurred, and their protoplasm is often converted into a fibrinous-looking mass staining a bright pink with eosin. Rather deeper in the serotina the decidual cells are normal, and in still deeper parts, especially between the glands of the spongy layer and just above this layer, the development of the ordinary connective-tissue corpuscles into decidual cells is very beautifully shown. The change consists in a progressive enlargement both of nucleus and cell-body, both of which stain more deeply than usual in the intermediate stage. The above arrangement of the different forms of decidual cells seems to be the typical one, but sometimes irregularities occur, *e.g.*, the intervillous spaces are sometimes bounded by cells still in the young stage. This is probably due to irregularity in the growth of the fœtal part of the placenta.

The impression produced by a study of these and of many other preparations is that, as the villi grow, the decidua serotina disappears before them. It is an obvious and well-known fact that the maternal part of the placenta at the end of pregnancy is exceedingly small as compared with the fœtal part, and very much smaller than it is in the earlier months, but the cause of this decrease is not so obvious. It must, of course, be evident from what has been said that the degenerating decidua is absorbed, but, is it absorbed by mother or by fœtus? It is difficult to believe that the absorption is carried on by the maternal tissues, for in the first place there are not many lymphatic vessels to be found in the decidua; and in the second place, though leucocytes, the usual removers of dead material, are present in considerable numbers in

the decidua, they are to be found rather in the active parts of it than in those already degenerated, and they do not seem sufficiently numerous for the task of absorbing what is relatively such a large mass of tissue. Can the fœtal tissues be the absorbing agents? We are inclined to think that they are, in part at least, and would point in support of this to the analogy of the rabbit's placenta, where the fœtal epithelium certainly must absorb or cause absorption of the degenerated epithelium and connective tissue of what one may call the serotina there, as we have already pointed out. A further support to this theory is to be found in the existence of a very peculiar set of cells in this placenta, which do not seem to have been described elsewhere. We have already pointed out that the villi tend to have a thicker epithelium towards their extremities, and at the very tips of the villi, where they come in contact with the surface of the degenerating decidua, we find the cells in question, epithelial in character, as Figs. 7 and 9 show, and apparently resulting from a proliferation of the epithelium at the extremities of the villi. They are rapidly growing, as the occurrence of numerous mitotic figures among them sufficiently demonstrates, and they have all the characters of embryonic epithelial cells,—a round, deeply staining nucleus, a clear cell protoplasm, and sharply-marked cell outlines. They remind one, in fact, most forcibly of the cells of the "ectoplacenta" in the rabbit, the epiblastic epithelium which destroys the degenerated uterine epithelium, and is the forerunner of the true placenta. These masses of cells, which are directly continuous with the epithelium covering the villi, form, in sections, irregularly-shaped projections, often ten or a dozen cells deep, whose surface towards the serotina is usually flattened and rests directly upon the degenerated tissues there, or sometimes even upon young decidual cells. When this occurs, the difference between the two sets of cells is at once apparent. It seems possible that these cells may have to do with the absorption of the degenerated decidua, and that they may even utilise the material obtained from the disintegrating cells for their own nutrition, and at the same time indirectly favour the nutrition of the fœtus by hastening the removal of temporary tissues, and furthering the formation of the true placenta. Probably this epithelium early fulfils its function and itself disappears, as it is not found, at least in the form here described, in any of the later placentæ we have examined, nor does it seem to have been noticed by other authors. In the placenta of a four and half months' uterus, which we owe to the kindness of Dr William Russell, we found, however, a set of cells at the points where the villi impinge upon the serotina, which apparently represent a later stage of this "trophoblastic" epiblast. One of these points is represented in Fig. 8, and the cells in question are seen to form a double or treble row of large embryonic-looking cells continuous with the epithelium covering

the rest of the villus, which consists at this point of two layers. The portion of the serotina touched by these cells is extremely degenerated. It will be noticed that the connective tissue of the villus is condensed to form a sort of basement membrane below the trophoblastic cells at this stage, which does not occur in the six weeks' pregnancy.

Other Human Pregnancies.

These resolve themselves into two classes—the early abortions, and the later uteri with placentæ *in situ*. The former are not usually suited for the study of the minute relations of parts, as the whole deciduæ and embryo very seldom come away at once, and even when this does exceptionally happen, the relations are almost invariably disturbed by blood extravasations, old or recent. The latter class of preparations in our hands forms an extremely valuable series, but at present we propose only to utilise them to explain the further history of the villi, with special relation to their epithelial covering.

The Early Abortions.—We possess several, of dates from one to three months, and the villi in those parts which are least disturbed present appearances identical with those of the six weeks' pregnancy described at length. All the early specimens indeed show similar appearances, and it is not till we reach the specimen (6, p. 197) that we find any marked change, though the epithelium becomes flatter in the latter specimens.

Four Months' Uterus and Placenta (see Fig. 3).—The villi are covered by a single layer of epithelium, which consists of flattened, deeply stained nuclei, embedded in a thin protoplasmic layer, in which the cell outlines can no longer be distinguished. Towards the tips of the villi there are sometimes two layers, and at the very extremities there seem sometimes to be several layers; but as our sections of this specimen were not cut in series, it is impossible to be certain on this point. At some points on the villi there are patches of that deeply-staining substance derived from degenerated epithelium to which Langhans, Minot, and others have given the name of "canalised fibrin." The villi which are actually embedded in the degenerated superficial decidua have no epithelial covering.

Four and a half Months' and Six Months' Uteri.—The appearances here are practically identical with those of the four months' uterus.

Full-time Uteri and shed Placentæ (see Fig. 4).—In all of these there is only one layer of epithelium covering the villi, and it is flatter even than in the four months' uterus. The nuclei are almost all degenerated, and the protoplasm in which they are embedded is small in amount. The deeply-stained masses mentioned in the description of the four months' uterus, which

have the appearance of being agglomerations of degenerated nuclei, are here much more numerous. The free villi at the deeper part of the placenta do not differ, as far as their covering goes, from those of the more superficial parts; there is no thickening of the epithelium. In the uteri with placentæ still attached there is a relatively large number of villi embedded in what is left of the decidua serotina. These villi have no epithelial covering, and the superficial layer of the decidua in which they lie consists of a degenerated homogeneous-looking connective tissue, in which the remains of decidual cells can here and there be distinguished.

It will be seen from these descriptions that we can fully confirm Minot's dictum, that "the chorionic epithelium advances in its differentiation to a stage equivalent to the two-layered stage of the epidermis, and there stops; whatever further change occurs is degenerative."

The only other important points in which the villi alter histologically are in regard to the connective tissue and blood-vessels. As pregnancy advances the connective tissue becomes more fibrous and generally more fully organized, and the blood-vessels become more numerous, wider, and have more fully differentiated walls.

We have now to consider some questions as to the structure of the human placenta, restricting ourselves to three points:—

1. *The nature of the covering of the villi, and the alleged rôle, in the formation of the placenta, of the surface epithelium.*
2. *The probable nature of the decidua reflexa.*
3. *The probable reason why the human ovum grafts itself, as a rule, within a certain area of the genital tract.*

1. *The nature of the covering of the villi, and the alleged rôle, in the formation of the placenta, of the surface epithelium of the serotina.*

In this country no paper has dominated research on these points so much as the classical one of Goodsir, "On the Structure of the Human Placenta," followed up as it has been by the well-known work of Ercolani and Turner.

Goodsir described a double epithelial covering of the villi, and held the outer to be maternal and the inner fœtal. He also figured a distinct space between these, bounded by a limiting membrane, and also an outer limiting membrane to the maternal epithelium. He speaks of part of the decidua serotina being shut off from the main portion by the maternal sinus system, the cells of the two being continuous by the lumen of the threads "which passed in great numbers from the vascular edges of the venous openings, and from the walls of the cavity of the placenta on to the extremities and sides of the villi and tufts of the placenta." He then goes on to say, "This observation led me at once to perceive the real signification of the external cells of the placental

tufts. I saw that the great system of cells was a portion of the decidua, all but cut off from the principal mass by the enormous development of the decidual vascular network, but still connected with it by the minute files of cells which fill the cavities of the placental threads. This system of cells, the external cells of the villus, with the external membrane, belong to the organism of the mother."

Turner, in his paper "Some General Observations on the Placenta, with special reference to the Theory of Evolution," represents the maternal epithelium as a fully-developed layer over the villus, stating at the same time that "the layer of fœtal epithelium cannot be seen on the villi of the fully formed placenta" (p. 37, text of fig. 7). He also figures Goodsir's threads as connective-tissue strands joining serotina and villus. From a consideration of our specimens, we believe that the covering of the villi is in the early placenta made up of a multiple layer of epithelium, and that it is epiblastic, *i.e.*, entirely fœtal. It is impossible to look at our specimens and to come to any other conclusion. We hold that Goodsir's investigation by no means proves that the maternal epithelium is represented on the villus. The recent work on the early relations of the villi and maternal tissue in the bat, rat, and ruminants, has shown that shortly after ovum-contact the maternal epithelium disappears, *i.e.*, the villi come into immediate relation with the connective tissue. In the paper of Turner's already quoted, the diagrams should, in our opinion, be modified by the obliteration of the maternal epithelium, as this plays no essential part in the formation of the placenta.

The important question has now to be considered as to what condition the serotina is in when the villi graft themselves. The early pregnancy specimen shows *the decidua vera fully completed and covered with columnar epithelium, while the reflexa is also covered in great part with columnar cells.* This tends to show that the ovum has not grafted itself on a fully-formed decidual portion, with its surface epithelium formed, but on the decidua while forming. This point, however, comes up more clearly in our next section (2).

2. *The probable nature of the decidua reflexa.*

William Hunter first pointed out that the human ovum had a decidua arched over it, and he applied the term "reflexa" to this portion. In no human ovum has this been found incomplete, although the general text-book diagram represents the decidua serotina sending folds up to coalesce over the ovum—a purely literary description based on no observation. That there is a decidua reflexa admits of no doubt. Its method of formation has, however, been disputed. Goodsir speaks of it as a cellular decidua formed "of a non-vascular cellular substance, the product of the uterine follicles." Goodsir evidently felt the difficulty of explaining the decidua reflexa from a completed serotina with its surface

epithelium fully formed, and clothing the external surface of the villi. Hence his hypothesis, which is just John Hunter's, without the "cellular."

The whole difficulty as to the reflexa disappears if we accept the hypothesis our specimens so strongly indicate. The villi, with their epithelial covering, purely epiblastic and fœtal in its origin, graft themselves on the decidua serotina, *while this serotina is forming, prior to its completion, and thus the serotina completes itself over the ovum, as it were; the ovum becomes embedded in the serotina, and the reflexa is merely the superficial portion of the serotina. The serotina proper is the deep portion.*

We consider the human ovum to be an embedded one, not attached to the serotinal epithelial surface, and with the epithelial folds of the serotina arching over it to form the so-called reflexa, but one actually growing in the substance of the serotina. This idea of an embedded ovum is of great interest in relation to the development of the placenta in other mammals, but we defer consideration of this point.

3. *The probable reason why the human ovum grafts itself, as a rule, within a certain area of the genital tract.*

It is a remarkable fact, that the human ovum grafts itself normally in a definite and limited area. This area is the triangular surface of the mucous membrane of the body of the uterus, and is bounded below by the os internum, above by the inner openings of the Fallopian tubes. The ovum never grafts below the os internum, and very rarely in the Fallopian tubes. It is also noteworthy that the ovum normally grafts itself only within the limits of that part of the mucous membrane of the uterus denuded of its superficial layer by the menstrual flow, and only rarely in the tubes which do not participate in menstruation so far as providing the menstrual discharge is concerned.

The hypothesis we now advance completely explains all the facts both as to normal and abnormal implantation that are at present at our command. It is briefly this. Suppose the human ovum cannot graft on an epithelial surface, but only on connective tissue. We say suppose, but there is strong if not absolute proof for the supposition.

1. In many mammals with a bicornuous uterus it has been clearly demonstrated that the first result of the touch of the villi on the uterine mucous membrane is to cause the disappearance of the epithelial covering, *i.e.*, the villi develop in connective tissue.

2. In the human ovum the villi have never been seen in contact with the surface epithelium of the serotina, although of course pregnant uteri in the very earliest stages have not yet been obtained.

3. The villi of the human ovum have always, in the earliest stages as yet obtained, been seen developing in connective tissue.

Under our hypothesis we understand at once—

1. That menstruation denudes the surface epithelium in the special area for safe-grafting of the ovum.

2. That the ovum, even if fertilised in the Fallopian tube, cannot graft itself there, as the epithelium is intact.

3. That it may graft itself in the Fallopian tube, if the epithelium has been removed by disease and the connective tissue laid bare.

4. The decidua reflexa is at once explained.

In the six weeks' pregnant human uterus, and also in a five months' one, we found at the tips of the villi active phagocytic cells, analogous to those in the villi of the hedgehog, rabbit, and rat, credited with the power of active absorption of epithelial and connective tissue.

It is therefore possible that, as Hubrecht supposes, we get a process in the early stages of human pregnancy analogous to the hedgehog, *i.e.*, the early epiblastic covering of the ovum grafts itself on a fully formed serotina, destroys the epithelium, embeds itself in the serotina, which closes over it, thus forming the reflexa; and that the villi and intervillous spaces form as in the hedgehog. There are, however, additional facts in regard to human pregnancy, considered as that of the pregnancy in the highest mammal, which must be taken into account in forming a hypothesis. These are—(1) the occurrence of menstruation, which denudes a certain area of the genital tracts of its epithelium monthly; (2) the great danger of Fallopian tube pregnancy; (3) the non-occurrence of pregnancy during suckling when no menstruation goes on.

We have therefore put forward, as a mere working theory, the hypothesis that the human ovum can only graft on connective tissue, a view that can be added, as it were, to Hubrecht's speculation.

Literature.

Duval (M.)—"Le Placenta des Rongeurs," *Journ. de l'Anat. et de la Physiol.*, vol. xxvi., *et seq.*

Frommel.—*Ueber die Entwickelung der Placenta von Myotus murinus.* Wiesbaden, Bergmann, 1888.

Goodsir (John.)—"The Structure of the Human Placenta," *Anat. Memoirs*, edited by Sir Wm. Turner, p. 445. Edinburgh, A. & C. Black, 1868.

Gottschalk.—"Beitrag zur Entwickelungsgeschichte der menschlichen Placenta," *Arch. für Gynäk.*, Bd. xxxvii. 2.

Gottschalk.—"Weitere Studien über die Entwickelung der menschlichen Placenta," *Arch. für Gynäk.*, Bd. xl. 2.

Hubrecht.—"Studies in Mammalian Embryology: I. The Placentation of Erinaceus Europæus, with Remarks on the Phylogeny of the Placenta," *Quarterly Journ. of Micros. Science*, vol. xxx. p. 283.

Kastschenko.—"Das menschliche Chorionepithel und dessen

Fig. 1.

W. & A.K. Johnston, Edinburgh

Fig. 2.

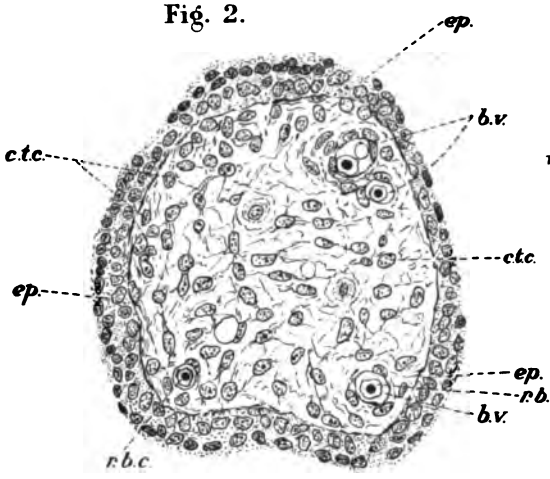


Fig. 3.

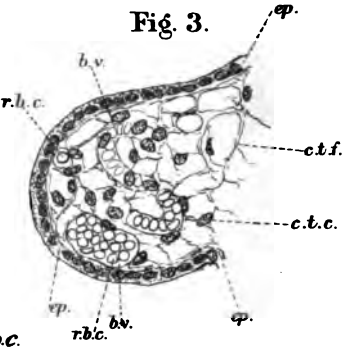


Fig. 4.

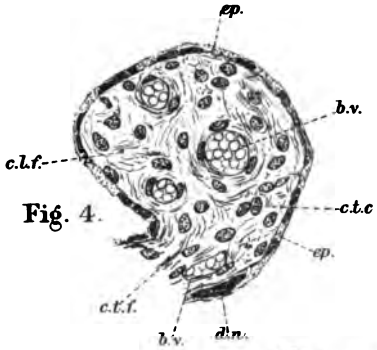


Fig. 5.

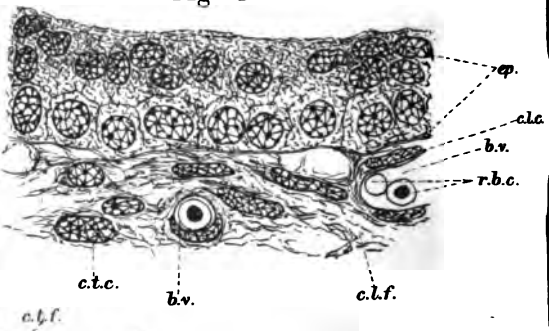
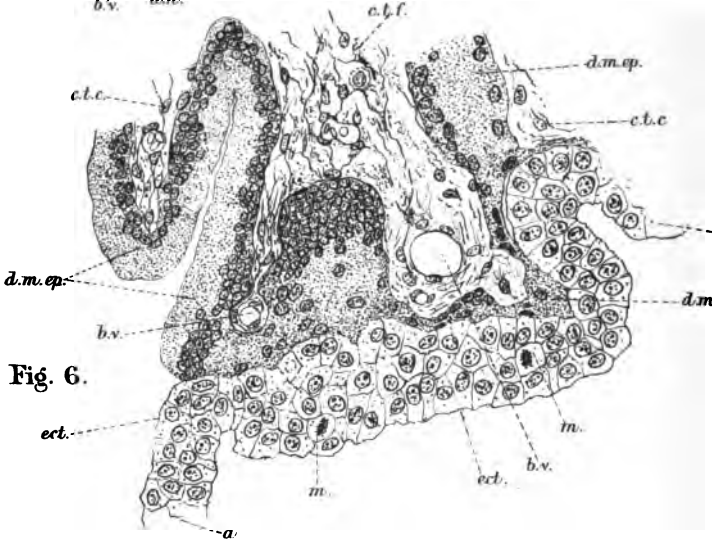


Fig. 6.



G. L. Gulland del.

W. & A. K. Johnston, Edinburgh & London

Fig. 7.

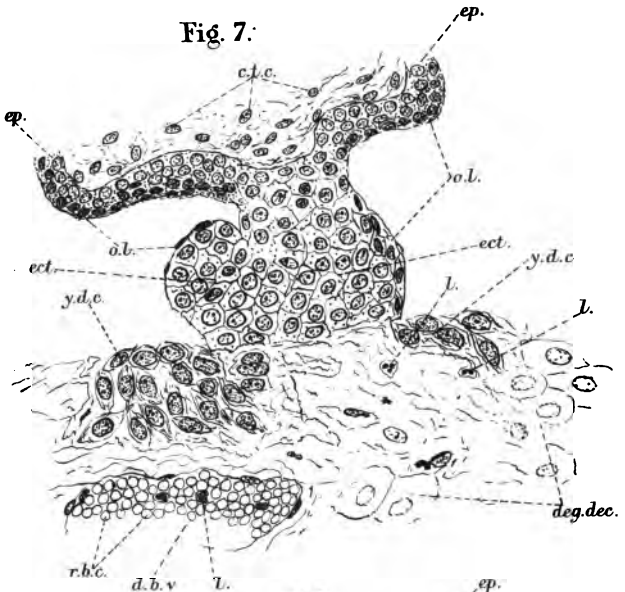


Fig. 9.

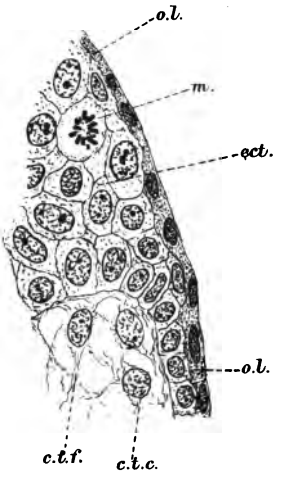


Fig. 8.

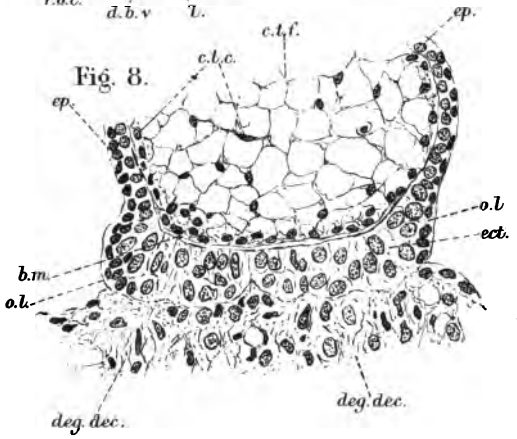


Fig. 10.

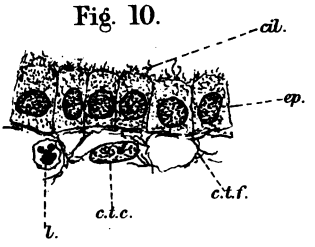


Fig. 11.

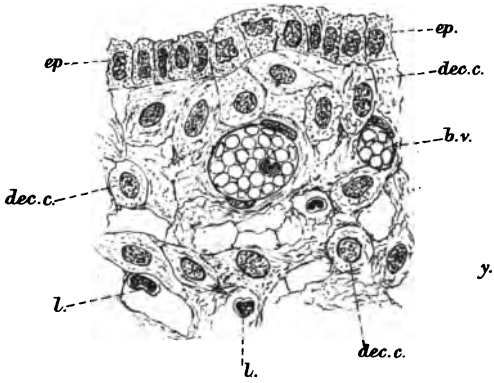
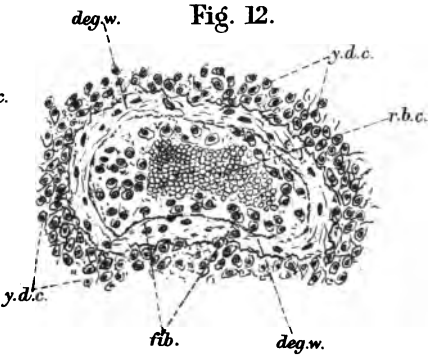


Fig. 12.



G. L. Gulland del.

W. & A. K. Johnston Edinburgh & London

Rolle bei der Histogenese der Placenta," *Archiv für Anat. und Entw.* His and Braune, 1885.

KEIBEL.—"Zur Entwickelungsgeschichte der menschlichen Placenta," *Anatomischer Anzeiger*, p. 537, 1889.

LANGHANS.—"Untersuchungen über die menschliche Placenta," *Arch. für Anat. und Entw.* His and Braune, 1877.

MINOT.—"Uterus and Embryo: I. Rabbit; II. Man," *Journal of Morphology*, vol. ii. p. 341.

TURNER (SIR WILLIAM).—*Lectures on the Comparative Anatomy of the Placenta.* Edinburgh, A. & C. Black, 1876.

TURNER (SIR WILLIAM).—"On the Placentation of the Ape," *Phil. Trans. Roy. Soc.*, part ii., 1878.

For additional literature, see MINOT.

DESCRIPTION OF PLATES.

The following letters are used in all the figures with the same meaning:—

e.p. = epithelium.	*b.v.* = blood-vessel.
c.t.c. = connective-tissue corpuscle.	*l.* = leucocyte.
c.t.f. = connective-tissue fibre.	*r.b.c.* = red blood corpuscle.
m. = mitotic figure.	*deg. dec.* = degenerated parts of decidua.

FIG. 1.—Six weeks' pregnancy, human; a section at the point where the decidua reflexa joins the decidua vera and decidua serotina.
a. = amnion; *ch.* = chorion; *ch.v.* = chorionic villi, with intervillous space; *v.* = villus; *d.r.* = decidua reflexa; *d.v.* = decidua vera; *com.l.* = compact layer; *sp.l.* = spongy layer; *mus.* = uterine muscle; *gl.* = gland; *dil. gl.* = dilated glands of spongy layer.

FIG. 2.—Transverse section of a villus from placenta of human six weeks' pregnancy. Obj. Zeiss. DD. Oc. 4.

FIG. 3.—Part of a villus from placenta of human four months' pregnancy. Obj., etc., as in fig. 2.

FIG. 4.—Part of a villus from human full-time placenta; *d.n.* = mass formed of degenerated epithelial nuclei. Obj., etc., as in fig. 2.

FIG. 5.—The two layers of epithelium clothing the villi of human six weeks' pregnancy. Obj. Zeiss. Apoc. 2·0 mm. hom. imm. Comp. Oc. 8.

FIG. 6.—Ectoplacenta ("trophoblast") of eight days' pregnancy (rabbit), in its relation to the uterine epithelium; *d.m.ep.* = degenerated maternal epithelium; *ect.* = ectoplacenta, at *a.* passing down to become continuous with the rest of the epiblast. Obj. Zeiss. Apoc. 2·0 mm. Comp. Oc. 4.

FIG. 7.—Trophoblastic (?) epithelium at the extremity of villus in six weeks' pregnancy (human). *y.d.c.* = young decidual cells; *d.b.v.* = bloodvessel with degenerated walls; *d.c.* = degenerated decidual cells; *o.l.* = degenerated outer layer of fœtal epithelium. Obj., etc., as in fig. 6.

FIG. 8.—The same, from four and a half months' pregnancy. *b.m.* = basement membrane. Other letters, Obj., etc., as in fig. 7.

FIG. 9.—Part of the trophoblastic epithelium from a section similar to that represented in fig. 7. Obj. Zeiss. Apoc. 2·0 mm. Comp. Oc. 8.

FIG. 10.—Epithelium from a uterine gland in the serotina immediately underlying the villus drawn in fig. 9, under the same power, for comparison. *cil.* = remains of cilia.

FIG. 11.—Epithelium covering the decidua vera in six weeks' pregnancy. *d.c.* = decidual cells. Obj., etc., as in fig. 6.

FIG. 12.—Thromboesed vessel from serotina of same case, surrounded by forming decidual tissue. *fib.* = fibro-blasts; *deg. w.* = degenerating vessel wall. Obj. Pillischer ½. Oc. 2.

The President made some remarks, and Drs Hart and Gulland replied.

MEETING VI.—APRIL 13, 1892.

Dr JOHN PLAYFAIR, *one of the Vice-Presidents, in the Chair.*

I. ON THROMBOSIS OF THE PULMONARY ARTERIES, WITH REFERENCE TO TREATMENT BY INHALATION OF OXYGEN.

By HENRY M. CHURCH, M.D., B.Sc., F.R.C.P.E.

DURING the twenty years I have been in practice I have attended about 700 cases of midwifery. This is perhaps not a large number, but it is a large enough proportion to the other work and anxieties of one in general practice. Out of this number I have lost eight cases: five from puerperal septicæmia in the earlier years of my practice, induced in every case, I believe, by defective sanitary conditions, two others making a narrow escape by frequent and thorough irrigation of the uterus with antiseptics; one case died from exhaustion, the result of excessive hæmorrhage of placenta prævia; one from typhoid fever; and one, the last, from pulmonary thrombosis, which occurred only a few months ago, and which I think right to bring before your notice to-night. Not that there is much to be learned from the case, nor in its record anything likely to enable us to foresee or prevent such an occurrence. If a suggestion as to treatment when the accident has happened can be made, that is all that I can hope for. But the dreadful nature of such a case, and the possibility of any accoucheur being without warning suddenly brought face to face with it, justify a short consideration of the subject, and thereby perhaps lessen the shock when a case does occur in practice, by familiarising our minds with its phenomena and treatment, as far as treatment is possible. But may each one of us here pass twenty years in practice before meeting with a case!

During the absence of a medical friend while away on his holiday last autumn, I was called to attend a patient of his, a lady of a rheumatic constitution, aged 36, in her sixth confinement, about the full time. I went at once when called, and found her pretty far advanced in the second stage of labour, walking about her bedroom, with her pains coming on regularly, borne quietly and bravely. Her general *morale* was good. Indeed, everything

seemed most satisfactory, and everybody in the house, including her husband, who was a medical man himself, felt quite easy about her. In a few moments, however, we were plunged into extreme fear and concern for her. I had been asked to retire while the patient got up. Just as she got into bed again a cough was heard, and I was hastily summoned. At first glance I thought my patient was in the first stage of a fit of epilepsy or eclampsia: the face was deeply cyanotic, there were tumultuous movements of the muscles of the face and chest, and froth issued from the sides of the mouth. She was lying on her left side, with her face, now getting dark livid, turned towards the pillow, eyes protruding, and the white froth rapidly increasing in quantity and welling from the edges of her mouth. I can liken it to nothing so much as froth oozing from a brisk bottle of beer. This froth soon became tinged with blood. She at one moment pressed her closed hands against the mattress, at another clutched at her breast as if to withdraw an intolerable pressure. She attempted to cry "Oh, dear!" and looked for help. Indeed, it is almost impossible to describe her condition, so sudden, horrible, and appalling was the asphyxia. Recognising what had happened in the pulmonary artery or in one of its branches to the lungs, and fearing immediate death, I sent for further assistance, and in a little had the kind aid of Dr Barbour. When the immediate danger to the life of the patient from the first shock of the pulmonary impaction had passed, the labour pains returned, and after three or four apparently strong ones the child was expelled, the placenta and membranes soon following, and the empty uterus contracting well.

Hoping against hope that the completion of delivery might bring relief, I adopted little treatment. Indeed, what could be done? The case was new to me, and from what I can learn from the literature of the subject, rare, having been unable to find even one case on record where thrombosis or embolism of the pulmonary arteries—by that I mean sudden and dangerous obstruction or plugging of them—came on *before* the birth of the child. The child was alive and has done well. The mother after a terrible struggle, marked by remissions and exacerbations, which continued for three days, died. As regards the uterine conditions, everything was normal during this period of survival. Immediately after the birth of the child, and when the symptoms, instead of being relieved, threatened to assume the intensity of their primary onset, I applied dry-cupping glasses freely to the chest and sides, and also large poultices, which seemed to diminish the clutching for breath. Air entered the lungs freely, but the features continued cyanotic; the heart sounds could not be heard on account of the noisy and rapid breathing, and the heart was felt to be quick and tumultuous in its endeavour to force the blood past the obstruction in the pulmonary artery to the lungs for aëration. The lungs were not at fault, nor was the heart; but there was a sudden and

almost complete damming up of the stream of life between the two. Had it been complete, the patient must have died of asphyxia at once. Dr Barbour and I remained for some hours, aiding as best we could. Stimulants—whisky, brandy, and ammonia—were freely given, and also frequent hypodermic injections of sulphuric ether, which enabled the heart to rally. We left her somewhat relieved. About three hours afterwards, in the early morning, I was again summoned, with the message that she was dying. A slight movement had increased the demand for oxygen, which could not be supplied. If one could only have got the blood to the oxygen, or oxygen in some concentrated form to a stream, even a small stream, of the blood, what a relief to the patient! As it was, the heart in its increased endeavour had become exhausted, and had a feeble and fluttering beat; but with a greater degree of rest, and copious use of stimulants as before, it regained more regularity. I remained at her bedside most of the night, watching the effects of the stimulants, and endeavouring to get the *fresh air* to her as much as possible. As long as rest and stimulants were alike enforced, the patient seemed better. Manifestly, therefore, a certain quantity of blood, passing between the obstruction and the walls of the vessel, reached one or both lungs. Whenever the heart was not spurred on by the stimulants, or whenever the slightest movement necessitated more oxidation, the balance was destroyed, and death from asphyxia threatened. And nothing added more to the terror of the scene than the complete consciousness of the patient, during most of the time, that death was imminent, and who always hailed my entrance with the cry, "Oh, can nothing be done to save me?" Thus she continued for three days till the pulse became thready and imperceptible, the respirations more and more hurried and short, and the exhausted heart could battle on no longer. Shortly before her death she fell into a state of coma, and no doubt the cardiac failure was also due to the fact that as little aërated blood could reach the left side of the heart, the medulla oblongata and brain were insufficiently nourished for the innervation of heart and lungs. Besides this, the heart walls themselves had become enfeebled by their own anæmia.

There was no post-mortem examination, which I much regret. The painful certainty of the cause of death seemed not to call for it at the time. Still something might have been learned from the position and shape of the clot, and its relation to the pulmonary artery, whether in the pulmonary artery itself or in one or other of its branches. Specially is it to be regretted, as I have been unable to find a pathological specimen in the Museum of the Royal College of Surgeons, whereby to illustrate this sad puerperal accident.

For long has the presence of clots in the veins, and even in the right side of the heart in the lying-in woman been known to physicians; but their association with sudden death after

labour had not been recognised, their true pathology and the phenomena to which they may give rise for the most part had been misunderstood. But at an early date there was groping after the truth. As far back as about 140 years ago, Van Swieten recognised that clots occurred in the vessels during the puerperium, and wrote gravely of their prognosis. He even performed experiments on animals, injecting acids into the veins, and bringing about phenomena in some cases identical with what we observe in phlegmasia dolens, and in others the *severe and sudden* symptoms which we know to characterize thrombosis and embolism of the right side of the heart and pulmonary arteries. For long after Van Sweiten's time great darkness hung over the pathology of the subject. But we cannot but admire, in the writings of 100 years ago, the detail of description given of individual cases, as well as comprehensiveness of observation. May I quote from an old book, written by what was then called a "man-midwife," a few quaint and last-century sentences. In 1784 Dr Charles White, a distinguished London physician, writes regarding "white swelling":—"This disease attacks women who are in full strength, and those who are reduced by flooding; those who have a moderate discharge of the lochia, and those who have a small or large quantity; those who give suck and those who do not; whether their breasts be drawn or not; and whether they have a great deal or little milk. It attacks women who were delivered on the knee, and others who were delivered on the side; but of those who were delivered on the side, it appears that the greater number were affected on that side on which they lay at the time of delivery. It attacks women of all ranks and of different habits, both the rich and the poor; the most healthful, as well as those who have laboured under chronic diseases; the strong and the weak; the lean and the corpulent; the sedentary and the active; the young and the middle-aged; after their first or any other labour; and whether the labour be natural or preternatural; but I have not known it happen after a miscarriage, nor to a woman more than once, though she has afterwards had more children. It happens at all seasons of the year indiscriminately, and in the country as well as in large towns. It never attacks either of the arms, or other parts of the body. I have never known it to suppurate or prove fatal, or any material inconvenience to arise from it after a few months have elapsed, except a little swelling of the leg after fatigue, particularly walking." And later on he says regarding white swelling, "that it will probably not be precisely ascertained till it be proved by dissection; and it may be a long time before such an opportunity offers, as this disorder has never been known to prove fatal." He evidently had not associated the sudden death, which must have occurred then as it does sometimes now, during the course of a white swelling, with the phenomenon of *a travelled clot.* That it was a disease of the lymphatics was long

held. Groping after its pathology in one case he says, "I punctured the leg with a lancet in several places, but no water issued, as it does in anasarca."

The truth only began to dawn about forty years ago, when Virchow in Berlin and Meigs in Philadelphia began to write on the subject of blood-clots stopping the stream of the circulation,—Virchow advocating that the obstructing clot must always *travel* to the heart and pulmonary arteries; Meigs advocating that it may be found *in situ* in the heart or pulmonary artery as well. Virchow upheld the *embolic* theory, Meigs the *thrombosis* theory. About the same time Miller in Edinburgh and Paget in London published illustrative cases, not puerperal, with post-mortem appearance of the clot. Since then much writing and much discussion have been at work in elucidating the truth regarding emboli and thrombi in the puerperal woman. These, as is now well known, may occur either in the *arterial system* or the *venous system*. In the former there is the tendency for the clot always to travel *from* the heart to the periphery, in the latter always *towards* the heart and lungs from the periphery. The subject of *arterial* obstructions occurring from detached cardiac vegetations blocking up the arteries we need hardly consider, though several interesting cases are recorded by the late Sir James Simpson in his *Selected Obstetrical Works*. In these cases the strain of labour detached vegetations which, carried to the bifurcations of arteries or into the smaller arteries, caused serious complications and delay in recovery, often to loss of limb or even life, as in the case of cerebral embolism. In regard to his recorded cases, I would just mention that he proposed, in the *Monthly Journal of Medical Science*, September 1847, the three following questions:—

"1. Was the obstruction of the artery, or arteries, in this case, produced by any mechanical cause, as one of the vegetations separated from the cardiac valves, carried along, in the case of the arm, for example, to the bifurcation of the humeral artery, and impacted there? 2. Was it not rather the result of an original puerperal arteritis? 3. Or might it be the effect of an effusion of coagulable lymph from phlebitic inflammation in the coats of the artery, a secondary phlebitic deposit upon the lining arterial membrane?"

But it is to *the venous part* of the circulation that the case I bring before the Society to-night invites attention, viz., the veins, the right side of the heart, and the pulmonary arteries. Fortunately, no one writer on the subject of pulmonary thrombosis has had many cases of his own to relate; but the cases that are recorded of clots occurring spontaneously in the right side of the heart or pulmonary artery, as I believe to have been the case in my patient, have much the same history; in some, where the main artery has been completely plugged, as in a case recorded by the late Prof. Miller, death occurring at once, and in others, where the plugging

was partial, after a struggle of a day or two, or even a much shorter time. Indeed, it would appear that if the patient can be tided through four or five days, recovery may take place; but this seems to be rare.

What then causes coagulation of the blood and the formation of these dangerous clots? We know that in the *puerperal state*, as also in rheumatism, fevers, and other blood dyscrasiæ, such as erysipelas, diphtheria, pneumonia, there is a great increase of fibrine in the blood, according to some authorities even one-third more than in health. We bear in mind also that after delivery there may be severe hæmorrhage, and syncope with the slowing of the blood-stream, increasing the tendency to coagulation. After delivery, too, the blood dyscrasia is increased by absorption of effete matters in the process of uterine involution. With such a coagulable blood, then, need we wonder that a thrombosis or deposition of fibrine should occasionally occur in some part of the venous tract, dangerous in proportion as it is near or far from the heart; or, in other words, whether it gives rise to a *pulmonary* thrombosis, or simply to a thrombosis in the *peripheral* veins, and causing what we are all familiar with as phlegmasia dolens. We have to remember also that plugs normally formed in natural labour in the open orifices of the uterine sinuses, after separation of the placenta, may find their way into the systemic circulation.

Some authorities maintain, among whom, as we have seen, is Virchow, that every case of pulmonary thrombosis has its origin, not in a spontaneous coagulation in the right side of the heart, but in an embolus which has travelled from the seat of some *peripheral* thrombosis. And no doubt this is often the case. For when the coagulum in a phlegmasia dolens is undergoing its retrograde change, a process taking many weeks, a portion is apt to be detached, on movement of the patient, for example, and swept into the circulation, and being carried to the heart and caught at the ramification of the pulmonary artery, may become, like a foreign body, a nucleus for the deposition of fibrine and the formation of a large clot. *Post-mortem* examinations in such cases, which are, however, rare, show beautiful examples of this. But it is equally true that what occurs *primarily* in the case of a phlegmasia dolens at the periphery, may also occur primarily in the larger volume of venous blood in the right side of the heart or pulmonary arteries. Or a thrombosis may occur *simultaneously* at the periphery and at the centre. Dr W. J. Playfair in advocating this brings forward clinical facts observed by him in support of it. He refers to cases of pulmonary obstruction that have not proved immediately fatal, and in which, shortly *afterwards*, phlegmasia dolens commenced. Showing thereby, that the coagulum was first formed at the centre, and then at the periphery. Of course, the reverse of this is much more common; still the cases would show that coagulation of the blood may occur

in the *first instance* in the right side of the heart. Nor is it always easy to tell from the appearance of the clot found after death what has been its origin. The appearance of clots *formed post-mortem* we are all familiar with. An *ante-mortem* clot is different, and whether originating in a small vein or in the neighbourhood of the pulmonary arteries, appears to present the same features in its process towards absorption. It consists, we know, of layers of decolorised fibrine, firm externally, but softened at the centre where fatty degeneration is taking place. Some pathologists maintain that out of almost every pulmonary thrombus a travelled clot or embolus may be *picked*, and profess to demonstrate whence it came by fitting it into the peripheral vein from which it got detached. Practically, however, from its *mere appearance* it seems difficult to say whether a thrombosis has occurred around an embolus, or formed *in situ without* such a nucleus. It is necessary to take into account the whole circumstances and symptoms of the case, and very especially *the date of attack*, whether soon after delivery, or not for three or four weeks. There seems now to be a consensus of opinion that in the *early* attack the case may be regarded as one of pulmonary *thrombosis*, and in the later, one of pulmonary *embolism*.

In the *Lancet* of 1867, Dr Playfair, in a series of papers "On Thrombosis and Embolism of the Pulmonary Artery as a cause of Death in the Puerperal State," produces strong argument in favour of the spontaneous origin of pulmonary thrombosis. In regard to these collected cases, Dr Playfair, in his *Science and Practice of Midwifery*, says:—"I there showed, from a careful analysis of 25 cases of sudden death after delivery, in which accurate *post-mortem* examination had been made, that cases of *spontaneous thrombosis* and *embolism* may be divided from each other by a clear line of demarcation, depending on the period after delivery at which the fatal result occurs. In seven out of these cases there was distinct evidence of embolism, and in them death occurred at a *remote* period after delivery; in none *before* the nineteenth day. This contrasts remarkably with the cases in which post-mortem examinations afforded no evidence of embolism. These amounted to fifteen out of the twenty-five, and in all of them, with one exception, death occurred before the fourteenth day, often on the second or third. The reason of this seems to be that, in the former, time is required to admit of degenerative changes taking place in the deposited fibrine leading to separation of an embolus; while in the latter, the thrombosis corresponds in time, and to a great extent no doubt also in cause, to the original peripheral thrombosis, from which in the former the embolus was derived. Many cases I have since collected illustrate the same rule in a very curious and instructive way." I have given this quotation, because twenty-five is a large number of such cases to have studied, and because the opinion of such an eminent authority as Dr Playfair, regarding the lesson to be learned from them, is of value. Meigs

of Philadelphia also graphically describes many cases, but in none of his did death occur suddenly. Paget records 17 cases of death associated with clots in the pulmonary arteries. None of them occurred in puerperal females. In 7 death occurred suddenly and unexpectedly. These writers do not record a case, nor does there seem to be any, where the asphyxia came on *before* the birth of the child. In this striking point does the case I bring before you to-night appear to be unique. With her the pulmonary obstruction came on, as we have seen, with all its intensity, while the head of the child was still upon the perineum. In her case, too, there was, as far as we know, no phlebitis, no heart lesion, no hæmorrhage, no syncope to slow the circulation and induce coagulation, no clot from an open uterine sinus, for the placenta had not yet separated. We have reason also to believe that there was no disease of the walls or lining membrane of the pulmonary artery. Simply was there the hyperinosis of advanced pregnancy, a hyperinosis increased by her rheumatic diathesis as the condition for clotting in her right ventricle or pulmonary artery. And as long as there was no displacement of the clot, no plugging of the artery occurred. That no displacement of clot may occur, one of the specimens (kindly lent me by Sir W. Turner) which I showed at last meeting of the Society proved, for in it were to be seen primary clots pressed against the wall of the vessel, and above them strata of more recent clot formation, continued until the calibre of the vessel was all but obliterated. But *displacement* of the clot is much more common, and, as in my patient, the moment the venous wave lifted it from its place and carried it on, the mischief was done. It would appear, then, that even in the presence of a clot, as long as it is undisturbed, the circulation may go on freely enough. And even when the pulmonary artery or a branch does become suddenly plugged, the circulation past the plug must in many cases be partially carried on. This, I would suggest, has an important bearing on the treatment by oxygen, to which I shall presently refer.

Pathological specimens show that clots in the peripheral veins *also* are not attached to the walls of the vessels, and that the blood may circulate more or less freely between them and the vascular walls containing them. But in either case how the patient's safety is in the balance! What consequences might not the slightest movement bring about! Surely, then, we cannot be too careful in warning our patients where there is the slightest suspicion of danger, and in the case of phlegmasia dolens allowing no movement for weeks after the disease appears to have gone. For is it not the case that, apart from all more serious accidents, many a *pneumonia*, or a condition of lung with all the symptoms of a pneumonia, coming on during the puerperium, may be due to the escape of a small embolus from a remote vein finding its way into a terminal branch of the pulmonary artery, forming a hæmor-

rhagic infarction there, and ultimately destroying a portion of the lung. It so happens that during the present winter several cases of sudden embolic pneumonia have been brought before my notice; but as these were not in the lying-in woman, I need simply mention them in connexion with the possibility of a coagulable condition of the blood being a cause of pneumonia. In these cases the coagulability of blood and the formation of an embolic clot may have been due to a slowing of the circulation from any depressing cause, such as influenza, or to an altered state of the bloodvessels, as much as to a change in the blood itself. The *converse* of this is also true, that pneumonia may be the *cause*, and not the result, of the formation of blood-clot. Dr Gairdner of Glasgow mentions that he has often found clots in the pulmonary arteries, extending into their ramifications, after death from pneumonia. Remembering that there is no anastomosis between the pulmonary arteries except through their remote capillaries, we see how any obstruction in these capillaries may retard the circulation in the pulmonary arteries, of which they are the terminations, and induce coagulation during life. In post-mortem examinations this coagulation is seen to extend backwards to the right ventricle in the cases to which Dr Gairdner refers. In the puerperium, therefore, we have to bear in mind the possibility of the onset of a pneumonia, associated with blood-clot in the pulmonary arteries, and that this blood-clot may either be the *cause* or the *result* of the pneumonic attack.

In relating my case I referred to the usual treatment which was carried out with all vigour, with the exception of large doses of strong ammonia recommended by some. Since, however, reading the interesting paper by Drs Lauder Brunton and Prickett "On the Use of Oxygen and Strychnia in Pneumonia" (*British Med. Jour.*, January 23, 1892), I have been greatly impressed with the utility of inhalation of oxygen in pneumonia, and regret that to my patient there was not applied a remedy which might have saved her life, and though not a case of pneumonia, still akin to it, as regards the limited amount of blood being aërated. For we have seen that in every case there is at least the passage of some blood past the clot to the lung, and if this could have been hyperoxygenated by the patient inhaling more oxygen, her life might have been sustained until the pulmonary clot had become fragmented or undergone its retrogressive change towards absorption. Less blood reaches the lung or lungs, but then it would carry, in its course from the lungs into the system, a larger quantity of oxygen. Dr Lauder Brunton records a case of pneumonia in a man, aged 40, "moribund, his face livid, the skin cold and covered with a clammy sweat, and loud mucous rattles accompanying every respiration," where $\frac{1}{20}$ grain of strychnine injected subcutaneously in order to stimulate the respiratory centre, and a tube of oxygen allowed to stream into the mouth, were followed by an "extraordinary transformation."

In a couple of hours he had "become perfectly conscious, his colour quite healthy, and he expressed himself as feeling comfortable and well." He ultimately died, but, as it was, had his life considerably prolonged, and probably would have been saved by a more timely administration of oxygen.

Dr Blodgett (*Boston Medical and Surgical Journal*) records a case of pneumonia in which the influence of oxygen is said to have been "almost as pronounced and evident as is that of ligature in hæmorrhage." Many similar cases have appeared in our medical journals during the last few weeks. From them we seem to have *in oxygen* a therapeutic agency of great value in diseases both mild and grave. Though it has a bearing on the subject, it almost looks like a parody on my case to mention that ladies in New York are said to prepare themselves for the fatigue of a ball, and with the view of improving their complexion, by putting their mouths to the oxygen inhaler before setting out. Surely, then, we cannot deny to a sister dying from want of oxygen, as my patient was, the inhalation of this life-giving gas. In no case does oxygen seem more likely to save life than in a case of pulmonary thrombosis, where there is no disease, but simply a shutting off of the blood from the oxygen taken into the lungs for its aëration. In my case I believe asphyxia might have been staved off, and the heart stimulated, had oxygen been constantly within reach of the patient in some more concentrated form than in the atmosphere. The mere escape of a little of oxygen gas into her bedroom might have helped,—a method which might be useful in many other affections than the one under consideration, when more oxygen is wanted without the danger of an open door or window. Unfortunately, oxygen is not always at hand in case of emergency, especially in the country. In town, however, it can be easily and quickly prepared at any laboratory, or by any practical chemist, and served to the patient in the simple and portable apparatus I showed at last meeting of the Society. It can also be procured at any time from the Brins Oxygen Works in London, and also from Glasgow, which supply it in a compressed form in iron bottles, and from which a bladder or india-rubber bag can be filled as required. A mouth and nose piece similar to that used in administering nitrous oxide gas may be used, or simply a glass tube introduced into one nostril or into the mouth. Of course, care must be taken that oxidation is not carried to such an extent as to injure the tissues. Half oxygen and half air seem to do well. The normal atmosphere is by bulk only one-fifth part of oxygen, so that this is a large addition.

Perhaps it is too much to expect that an oxygen bottle should be in the equipment of every obstetrician, but accoucheurs might do well to remember oxygen, in the event of a case occurring like the sad one with which I have introduced this paper. With the use of this additional means one would at least have the satisfaction of feeling that all had been done whatever might be the issue.

The Vice-President said he was sure he was reflecting the feelings of the Society when he said that they were deeply indebted to Dr Church for bringing before them this interesting and instructive case. Fortunately such cases were rare, but when they did occur, they were so sudden in their onset, and often so rapid in their course, that it was well they should have a clear idea of their nature, so that any assistance they could render to the patient should be prompt and properly directed. Dr Church's lucid history of his case, and his remarks on its nature and treatment, supplied them with this clear idea. As to the cause of the thrombosis in Dr Church's case, he thought that possibly it was due to the rheumatic condition of the patient, and the highly fibrinous state of the blood known to exist during pregnancy. It was possible that the rheumatic state of the patient might have produced a little roughening of the pulmonary artery, and so have given a starting point to the thrombus. The clot must have originated in the heart or pulmonary artery, as there was no evidence of any blocking of a peripheral vessel, from whence an embolus might have been carried. Dr Church's proposed treatment, by supplying excess of oxygen, seemed to him likely to be of great service. If the limited stream of blood passing by the side of the clot into the lungs could be hyper-oxygenated, life might be preserved, and so time given for absorption of the clot.

Dr Berry Hart thought Dr Church's paper a valuable clinical one. It was impossible, he thought, to explain the cause, though Dr Church's view was ingenious. The main difficulty in accepting it was that such cases should be very common if the theory were correct.

Dr Cullen had listened with great interest to Dr Church's paper, and would only wish to make a single remark thereon. He was doubtful as to the value of oxygen in these cases. It was well known that the oxygen forms a compound with the hæmoglobin of the blood, and under ordinary circumstances the hæmoglobin is entirely converted into the oxidized compound in the lungs. Thus, so far as the hæmoglobin is concerned, it could not take up more oxygen even if the person inhaled that gas in an undiluted form. Only a very small amount of the oxygen in the blood was carried by the serum, but that oxygen was not supposed to have the same value as regarded tissue change as the gas carried by the hæmoglobin. Inhalations of pure oxygen, then, could only increase the amount of oxygen in the serum of the blood, and that to any extent only under increased pressure.

Dr James Ritchie thought that Dr Church had very lucidly given the probable etiology of his unique case, but the speaker was of opinion that the condition of the pulmonary circulation during the pains would also favour the occurrence of thrombosis. He thought that experience was more valuable than theory, and Lauder Brunton's case was a practical demonstration that inhalation of

oxygen did in certain conditions improve the oxidation in the blood. Although the amount of oxygen in the atmosphere is enough to maintain the aëration of the blood when the circulation in the whole of the lung is available for the process, and although in such circumstances an increase in the depth of inspiration is not followed by an increase in the amount of oxygen absorbed, yet when a large portion of the lung was cut off from duty it seemed evident from experiment that the blood could utilize a larger amount of oxygen than the atmosphere contained normally.

Dr Church, in thanking the Society for their favourable criticism of his paper, thought that further clinical study would show that greater aëration of the blood takes place with the more free inhalation of oxygen where the natural conditions of respiration are interfered with. Physiologists admitted that with increased atmospheric pressure more air was taken into the lungs. A larger volume of air could not be taken up, but an equal volume with increased density could. Hence it could be logically maintained that more oxygen might be introduced into the system in time of need. In a case of asphyxia every physiological effort would be made to utilize all oxygen within reach of the blood. The subject was a difficult one in physiological chemistry, but it was to be hoped that *laboratory* would harmonize with *clinical* observations.

II. A NOTE ON THE USE OF THE AXIS-TRACTION FORCEPS IN THE HIGH AND LOW OPERATION.

By Michael Dewar, M.D., C.M.

A consideration of the details and results of the following cases of the high operation in contracted pelves with the axis-traction forceps, and a comparison of the results in my pre-axis-traction days with these, have induced me to lay before the Society a few notes on their use. These cases are the first in which I have had the opportunity of delivering with those instruments above the brim since I commenced to use them. Formerly I had been in the habit of using the ordinary Simpson long forceps in such cases, and when I failed to draw the head through the brim with them, I was obliged to resort to version, seeing that in these cases I could get no skilled assistance, being, when in Forfarshire, often from fifteen to twenty miles from home. This latter operation, of course, had to be as a rule performed under not very favourable circumstances, and the results, in my hands at least, were not very encouraging as regards the fœtus. Of twelve cases of version in my first thousand cases, I had six still-births, exactly 50 per cent.; while of my long forceps cases, which ended as such, there were 6 per cent. of fœtal deaths. I am of opinion now that, judging from my new experience, one should be able to deliver with the axis-traction forceps a greater porportion of living children in

rickety pelves, and thus avoid version with its greater mortality as regards the child, and the greater risk to the mother of puerperal troubles.

CASE I.—Mrs B., aged 38, a short, deformed, bow-legged secundipara with a flat pelvis, sent for me at 10.30 P.M. on 1st November last. She had been in labour for some hours. On making a p.v. examination, the os was found well dilated, the membranes intact, the head presenting; could just reach the head, but could not make out the position. The pains were strong and frequent; after some time the membranes ruptured spontaneously, when the head was found lying above the brim, there being no advance with the pains. By pushing the fingers well up, and steadying the uterus with the left hand, I could define the sagittal suture running upwards and forwards to the posterior fontanelle, indicating a R.O.A. position. As no progress was being made, I administered chloroform and attempted to apply the axis-traction forceps, but failed completely to get them locked, due to my want of skill in manipulating the rods. After several attempts without success, I withdrew the forceps and removed the rods, thus converting them into simple long forceps. On reintroducing them, they locked at once, but on making traction with all my strength, I could make no advance. I then allowed the forceps to remain in position and sent for my friend Dr Proudfoot to take charge of the chloroform, and induce deeper anæsthesia. I was then able to draw the head down into the pelvic cavity, and with a little care complete delivery without any further mishap, though when the head was passing through the vulva the perineum was in great danger for a time. By keeping back the head, however, so as to allow the perineum time to stretch, it was saved. There was a caput succedaneum on the left parietal region. The child, a male, was still-born. The mother recovered in the usual time, without a bad symptom.

CASE II.—Mrs K., aged 44, a spare, sallow, rickety primipara, sent for me on 7th November last at 10 A.M. She had had labour pains since the night before. On making the usual examination I found a slight mucous discharge, the os about the size of a crown piece, and the membranes entire. The head, which was the presenting part, could only be reached with difficulty. After waiting for a short time without much progress, I ruptured the membranes, and after pushing the fingers well up behind the pubic arch, made out the position to be L.O.A. in a contracted conjugate. I administered a little chloroform, and with my finger dilated the os sufficiently, and putting her more deeply under the anæsthetic, applied the axis-traction forceps, which locked at once, the rods coming together nicely. With not a little traction the head was dragged through the brim. Rotation into the antero-posterior diameter of the pelvis took place, after which I had simply to

follow the movements of the application handles till the head was completely born. The perineum was preserved intact. The child, a female, commenced to cry lustily, and the mother made an excellent recovery without a moment's anxiety.

CASE III.—Mrs Q., aged 35, a scrofulous, thick set, squat multipara. She had previously two female births without any instrumental aid, and two male births,—the first still-born, delivered by forceps, the second seven years ago, delivered after great difficulty alive by long forceps. I was sent for at 10 A.M. on 28th December last, and learned that she had been in labour since 3 A.M. On making a p.v. examination I found a slight muco-sanguineous discharge, the water having escaped, and the os about the size of a crown. The head was situated above the brim, and the sagittal suture could be traced upwards and backwards to the posterior fontanelle. The anterior fontanelle could not be reached, and therefore evidently a R.O.P. position above the brim. In a short time the os was sufficiently dilated to allow the introduction of the axis-traction forceps under chloroform, after the bladder had been emptied by catheter. The bowels had been relieved by castor oil the previous evening. The instruments were carefully introduced,—the lower blade over the posterior portion of the right parietal bone, and the upper over the left side of the head in the region of the ear (as shown by the pressure marks after birth). Traction was made moderately at first, gradually increasing till I was pulling with all my might, when suddenly the blades slipped off the head without moving the head in the slightest. I reapplied the forceps in much the same way, with a similar result. For the third time I applied them, taking care to get them over the occipito-frontal poles as nearly as possible. I had considerable difficulty in placing the upper blade over what I considered the proper place, the blade always being inclined to slip backwards to the side of the head. At last I succeeded, and when the instruments were locked, and the occipito-frontal diameter reduced, the head was with only a very moderate amount of traction drawn through the brim. After this I had very little to do except to reapply the forceps in the biparietal diameter, watch and follow the movements of the application handles, as in the second case. The head rotated into R.O.A., and was delivered in the usual way. When restitution took place, the face turned downwards to left thigh, and the left shoulder appeared under the pubic arch. The child, a male, was still-born (the mother had not felt movement for more than two days). The lower blade was over the occiput close to its junction with the right parietal, while the upper was over the left eye. The mother made a good recovery.

CASE IV.—Mrs M., a small, very much undersized multipara, sent for me at 5 P.M. on 25th February 1892. Her previous obstetric history is as follows: the first child, a boy, was born at

the seventh month, delivered at the brim by long forceps, alive; the second, a girl, after failure with the long forceps, was delivered by version with great difficulty, alive; the third, a miscarriage at the fourth month.

On making my visit on this, the fourth pregnancy, I found that she had been in labour since early morning. The water had escaped, the os was about the size of half-a-crown, and the head presenting, but high at brim. On calling again at 8 o'clock the pains were found to be more frequent but feeble, and the os almost fully dilated. The head, which had made no advance, was occupying the R.O.A. position. Very shortly afterwards I administered chloroform and applied the axis-traction forceps; and remembering my difficulties on the previous occasions, I placed the first blade over the right occiput, and the second blade over the left forehead above the left orbit. With moderate traction the head was drawn through the brim with comparative ease. Rotation did not take place till the head was well on to the perineum, but the latter being very distensile, I did not in this case remove the instruments till after the occiput had slipped under the pubic arch. The delivery was then completed in the usual way. The child was very lively, and the mother made an excellent recovery.

The first thought that will occur to every one is, that my success with the axis-traction forceps is quite as bad as the results of the operation of version after failure with the long forceps. But this is not so. In the first case, I hold that had it not been for my bungling with the traction rods and the long time taken to deliver the child, that child would in all probability have been born alive. The second case ended favourably. The third case could not have terminated in any other way, as the child had been dead for some days. The fourth case also ended favourably.

According to my experience, the chief difficulty to one using the axis-traction forceps for the first time in the high operation is the apparently hopeless task of getting the rods to come together properly, but when one has surmounted that difficulty it is all plain sailing. There is no difficulty whatever with the rods when applying the instruments to the head in the pelvic cavity or at the outlet. With these instruments properly applied and used, one should be able to deliver cases which without them would have to be delivered by version or by perforation. This leads me to a short consideration of the accident which befell me in the third case (the first time in my experience), when the forceps slipped off the head twice, and where on my applying the blade carefully over the occipito-frontal diameter of the head I was able to extract the head with comparative ease. The only way in which I can account for the slipping is, that the blades having been placed too far back in the biparietal diameter, the head was squeezed together in that axis, and, as a consequence, lengthening of the occipito-frontal

diameter took place. The occiput and forehead of the child necessarily rested on the brim of the pelvis, rendering its extraction next to impossible in a contracted pelvis, and when the very powerful traction was made on the bar, the blades were simply pulled off the head backwards. The head could not possibly pass through between the points of the blades. By applying the blades in the occipito-frontal diameter, or as near to it as possible, that diameter was very much reduced, the head becoming more rounded, and extraction was made very much easier.

A few days after the date of this third delivery I had the opportunity of reading the able paper on the axis-traction forceps by Dr Milne Murray, in which, at page 23, he describes the delivery of a child in the transverse axis by this same method. The comparative ease with which my fourth case was delivered still further illustrates the advantage to be gained by the use of these instruments. It would be well, therefore, to bear in mind that in cases at and above the brim, when the necessary amount of flexion has not taken place, one may by grasping the head in the occipito-frontal diameter, and thus shortening that diameter, be able to extract a living child easily with the axis-traction forceps, which under other circumstances might have to be delivered by version, with greater risk to its viability, or by perforation.

As regards delivery of the head in the pelvis and at the outlet, there cannot be the shadow of a doubt as to the immense advantage of the axis-traction forceps over the ordinary forceps, in administering at least to the comfort of the medical man. The ease and pleasure with which he can sit down at the bedside after the instruments are introduced and locked, and with one hand on the cross-bar follow the movements of the application handles, are in marked contrast to the awkward position one has to assume with the ordinary forceps. I do not think, however, that, in the matter of saving the perineum, the axis-traction forceps have any great advantage over the ordinary forceps, for I have delivered a fairly large number of all kinds of cases, and for various reasons with medium and short forceps, without rupturing the perineum beyond the fourchette, which goes in all first cases.

There is just one other point to which I might allude. Dr Murray in his paper, in referring to the gliding movement of the occiput over or under the pubic arch during the process of extension at the outlet, mentions that this movement is overlooked or ignored by many teachers, and therefore the process of extension is improperly taught. To me this seems incredible. I certainly went into practice under the belief that the occiput as a fixed point turned round the pubic arch as on a pivot. It was not very long, however, before I observed that this was wrong. The gliding movement may be seen by everyone who cares to look. Nature, if she can help it at all, will never allow the occipito-mental diameter to become engaged at the vulva. Repeatedly for the last sixteen

years in cases of stiff perineum I have held back the frontal pole so as to allow the occipital to get well forward under the pubic arch. There is no doubt that if the movement of extension were better understood, and a little judicious care taken at the birth, there would be fewer ruptured perinea.

The chief points, therefore, I would wish to emphasize are,—

1. The comparative ease with which one should be able with the axis-traction forceps to terminate favourably cases in which the head is above or impacted at the brim in flat pelves, and thus avoid the more serious operation of version, or even perforation. I would venture to affirm, that by a careful and intelligent use of these instruments any ordinary sized head may be dragged through a conjugate whose diameter is as low as three inches, without injury to the pelvis or to the child.

2. In the low operation, the ease and precision with which you can follow the movements of the head as indicated by the movements of the application handles, the avoidance of the awkward positions necessitated by the use of the ordinary forceps, thereby contributing to the comfort and the dignity of the obstetrician, and though my results with the old instruments *in saving the perineum* are quite as good as they ever can be with the axis-traction forceps, yet there can be no doubt as to the incomparable superiority of the latter over any other forceps which have been put into the obstetrician's hands.

The Vice-President said the Society was greatly obliged to Dr Dewar for his very able and interesting paper. He was sure they all agreed with him in urging the immense superiority of the axis-traction forceps over the ordinary long forceps. Personally he also heartily concurred with Dr Dewar's remarks on the great comfort in using the axis-traction forceps compared with the Simpson forceps. There might be a little trouble at first in getting the handle of the tractors fixed, but that over, the ease in farther manipulation was wonderful.

Dr Berry Hart thought Dr Dewar's paper one of great interest. It was most valuable to know the practitioner's opinion of new appliances, whether they were available and useful under the conditions of private practice. He was glad Dr Dewar's opinion was so entirely favourable to the use of the axis-traction forceps. The unfavourable view Dr Dewar took of version was hardly warranted if it was tried after forceps. The question of version or forceps was a difficult one, but so far as the rachitic pelvis was concerned, he held version to be preferable. The use of axis-traction had, however, re-opened the question, and he had no doubt it would be settled in time, without the acrimony of the old debates.

Dr J. C. Webster had shown at an earlier meeting in the session the head of a child which had been delivered by means of axis-traction forceps in a flat pelvis. The head had been grasped antero-

posteriorly, and, owing probably to the great over-riding of the frontals by the parietals, as well as to the bulging of the vertex, rupture of the longitudinal sinus had been caused, leading to death of the child. It had always been supposed that intra-cranial hæmorrhage was an almost necessary accompaniment of the use of forceps in flat pelvis, and it had occurred to Dr Webster to try a series of experiments on fresh still-born children in order to determine what intra-cranial lesions were produced. Four children were obtained, two of which had died from pressure on the cord during delivery; the cause of death in the other two cases, obtained from the Maternity, could not be made out. Three of these were drawn by means of axis-traction forceps through rickety pelves of various degrees of antero-posterior brim-contraction; the internal jugular veins were then injected with coloured blood-serum. In the other case the injection was made previous to the use of the forceps. In all cases the coloured fluid was found on dissection to have escaped from the intra-cranial vessels, either into the dura, the falx or tentorium, or through the dura into the sub-arachnoid space on the upper part of the brain or about its base. Dr Webster at first thought that these experiments showed the great danger to the child from the use of forceps in flat pelves, even taking into consideration the different conditions in the case of the operation during life and in the experiment on the dead child. Recently, however, in a valuable paper by Spencer ("On Visceral Hæmorrhages in Still-Born Children, etc.," *Lond. Obstet. Trans.*, vol. xxiii. p. 203), a detailed account of a series of 130 autopsies on fresh, mostly still-born, fœtuses had been given, and these examinations showed that intra-cranial hæmorrhages as well as other hæmorrhages occurred "in cases delivered naturally, or by version, or by forceps, through normal and abnormal pelves; in primiparæ and multiparæ; with large and small children; in easy and difficult, rapid and prolonged labours." In view of these facts, Dr Webster considered that his experimental results were worthless since the rupture of the intra-cranial vessels might have taken place in connexion with the birth of the fœtuses, and not as a result of the post-mortem experiments. He believed that only extended clinical experience could determine the relative value of turning and forceps as a means of treatment in cases of flat pelves. It is interesting to note that Spencer's cases show that cerebral hæmorrhage is most frequent with forceps delivery and least in normal vertex delivery, and that it is greater in breech cases than after version. He does not, however, specify the variety of forceps used. Unless he had reference to the axis-traction forceps, his results will not in the least help to settle the question recently raised by Milne Murray, as to the best mode of delivering the child through a brim contracted in the antero-posterior diameter, since the action of the axis-traction forceps is very different from that of the ordinary long forceps.

Dr Dewar thanked the Fellows for their kind reception of his paper. As regards the question of "Version *v.* Forceps," he did not wish to imply that his results led him to believe that forceps were in all cases superior to version, for version in the majority of his cases was only performed after failure with the long forceps. In a country practice, with a constantly shifting population, one does not always know what kind of a case one has to tackle till the actual delivery takes place. But he feels confident that the use of axis-traction forceps will reduce version to a minimum. As regards the comfort of the medical man, he has a very vivid recollection of the many awkward positions he had to assume, especially when attending a case in a box-bed.

III. THE SECTIONAL ANATOMY OF AN ANENCEPHALIC FŒTUS.

By J. W. Ballantyne, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Diseases of Infancy and Childhood, Minto House, and on Midwifery and Gynæcology, Medical College for Women, Edinburgh; Secretary to the Edinburgh Obstetrical Society.

The external appearances of the anencephalic fœtus are such as to suggest a disturbance of the relations of the internal organs to each other and to the vertebral column, and it was with a view to the demonstration of what these changed relations were that I examined one specimen of anencephaly by the frozen sectional method. The fœtus chosen for the purpose of this investigation was one sent to Prof. A. R. Simpson by Dr Miller of Sunderland, and I have to thank Dr Simpson for permission to examine it.

The *Clinical History* of the case may be given in Dr Miller's own words:—"In April 1888, the mother gave birth to an anencephalic fœtus. There was large excess of the liquor amnii, and the labour was very tedious. The mother on this occasion attributed the deformity to a fright received whilst carrying the child. She states that she has a great horror of frogs, and that whilst walking in the country a friend took up a dead frog and threw it at her. On her telling this to the nurse, she confirmed her in her opinion by saying that the child had the appearance of a frog. Six weeks after the birth of this child she menstruated slightly; she then became pregnant again, and expected the child about the beginning of March 1889. However, on January 27th, I was called to see her, and found her in labour, the os uteri being about the size of a half-crown piece. I waited till the os was largely dilated, and then ruptured the membranes, after which there was a tremendous gush of waters. Two or three pains now served to expel the child, which proved to be anencephalic like the former one." Her husband, whose second wife she was, had had by his first wife a child that died of hydrocephalus, and another that succumbed to spinal disease.

The interesting facts about the clinical history were—(1), that the

mother gave birth to two anencephalic fœtuses in succession; (2), that there was hydramnios in both cases; and (3), that the husband had had by a previous wife two children, one of whom died of hydrocephalus and the other of spinal disease. This last-named fact is no doubt of far greater etiological value than the alleged maternal impression, for it would seem to show that the father in this particular instance had a tendency to procreate infants with a morbid cerebro-spinal system; and the history of the birth of a child with hydrocephalus assumes some importance when it is borne in mind that anencephaly is by many considered as due to an early fœtal hydrocephalic condition.

The anencephalic eight months' fœtus, which was a female, was placed in the freezing mixture in the dorsal posture, with the thighs partially flexed on the abdomen and the arms lying by the sides. When frozen, a vertical mesial section of the head and trunk was made, a transverse one of the right half of the trunk at the level of the second lumbar vertebra, and several sections of the joints and of the feet. The appearances seen on section were traced and then drawn, and from their study, and from such further dissection as was required, the anatomical peculiarities of this fœtus were arrived at.

External Appearances.—The fœtus, a female, measured 38 cm. from head to heel, and the trunk alone was 23 cm. in length. The head measured in what may be called the diameter occipito-frontalis 5·5 cm., and in the diameter occipito-mentalis 6·8 cm. The transverse diameter both in front of and behind the ears was 6 cm. The transverse measurement of the face between the malar bones was 5·5 cm., and the vertical or fronto-mental was 6 cm. The transverse diameter of the shoulders measured very nearly 4 cm. The shortness of the fœtus and of its head diameters was, of course, due to the peculiar malformation of the cranium.

The monstrous appearance was caused by the absence of the cranial vault and brain and by the existence of a well-marked spina bifida in the cervical region. The head seemed to spring directly from the shoulders, giving to the fœtus a neckless appearance; the face was broad, in comparison with the head; the mouth was slightly open, and the nose was broad; the eyes were prominent, half open, and the eyelids were thick and œdematous-looking; and the ears had a twisted and deformed appearance, and rested on the shoulders, lying in the same transverse plane as the eyes. The vault of the cranium was entirely absent, and the basis cranii, covered by a reddish mass of fibres and blood-clot, was exposed to view. A large space was thus left on the top of the head, which was continuous with the spina bifida in the cervical region, and was surrounded at its margin by the skin, which carried a few scattered hairs. The forehead could not be said to exist, for the eyes and root of the nose formed the upper limit of the anterior part of the head. The shoulders appeared relatively broad in comparison with the small deformed head.

The rest of the body was well formed, and, as is common in this variety of malformation, there was a relatively large amount of subcutaneous fat. The skin surface had a bright pink colour.

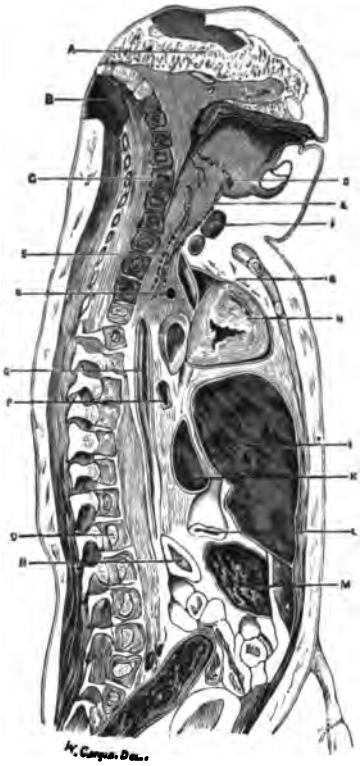


FIG. 1.—Vertical Mesial Section of Head and Trunk of Anencephalic Fœtus, left face shown (½ nat. size). A, bones fused together forming basis cranii; B, spina bifida: C, 7th cervical vertebra; D, hyoid bone; E, cricoid; F, thyroid gland; G, thymus; H, heart; I, liver; K, lobus spigelii, L, pylorus; M, transverse colon; N, third part of duodenum; O, second lumbar vertebra; P, œsophagus; Q, aorta; R, right pulmonary artery; S, trachea.

The insertion of the stump of the umbilical cord into the anterior abdominal wall was situated 4 cm. above the symphysis pubis, and 6 cm. below the tip of the ensiform cartilage. No examination of the placenta, membranes, or cord was possible, as these structures had unfortunately been destroyed at the time of birth.

From the external appearances it was evident that the specimen was one of anencephaly, and that it was of the derencephalic variety of Saint-Hilaire; for, whilst there was both absence of the cranial vault and spina bifida, the latter condition affected only the cervical region.

Regional Anatomy.—From a study of the frozen sections and from some further dissection, it was possible to investigate the regional anatomy of this fœtus. Unfortunately, the vertical

mesial section had not followed exactly the middle line of the body; it had deviated slightly to the right in the region of the face and to the left in the lower dorsal, lumbar, and sacro-coccygeal regions. This must be borne in mind in referring to the accompanying illustrations (Figs. 1 and 2).

The Region of the Head.—In this region were found the most marked abnormalities. As may be seen from the sagittal section, there was a complete absence of cerebrum and cerebellum along with the bones which normally roof in the cranial cavity. In the middle line could be seen the base of the cranium, lying almost entirely in the same plane, composed partly of bone, and partly, but to a small extent only, of cartilage, and showing an irregular arrangement of parts. Posteriorly, there was no trace of the foramen magnum; what appears to be the basi-occiput terminated abruptly, and was in immediate contact inferiorly with the altered odontoid process. Anteriorly, the basi-occiput appeared to be fused with the body of the sphenoid, which did not show any indication of the plate of cartilage which normally exists between the basi- and pre-sphenoid (Fig. 1, A). The sphenoid had lying in front of it the cartilaginous ethmoid. On the altered basis cranii lay a mass of blood-clot, rendered spongy by numerous fibres which traverse it, and covered by a membrane which was continuous with that closing in the cervical spina bifida, and which was firmly attached to the margins of the bones which formed the boundaries of the area on the upper surface of the head. In the region of the face, as seen in the section, the tongue was seen lying in close contact with the roof of the mouth, dental germs were present in the upper and lower jaw, and the buccal cavity became continuous with the pharyngeal at the level of the fifth cervical vertebra.

The further dissection of the head revealed the following facts:—The nasal spine and posterior part of the orbital plate of the frontal were the parts of that bone which were present. It articulated with the nasal bone, with the lachrymal, with the ethmoid, and with the pre-sphenoid and its great wing on that side. The external angular process of the frontal articulated with the zygomatic process of the temporal. The nasal bones were abnormally large and well ossified. The malar bones were also large, and each articulated with the external angular process of the frontal and with the great wing of the sphenoid, but not directly with the zygoma of the temporal bone. The petrous, mastoid, and zygomatic parts of the temporal were present, but the squamous part and the annulus tympanicus were entirely wanting. The zygoma articulated, as has been said, with what may be looked upon as the external angular process of the frontal. The inner end of the petrous part was fused with the sphenoid, and thus, together with the basi-occiput, formed a large keystone in the centre of the base of the cranium. There was no condyle on the petrous part of the

temporal for articulation with the lower jaw. In its place was found a small spine, which projected between the coronoid process of the lower jaw and a projection representing the neck of that bone below the condyle, for the mandibular condyle was absent. Above and behind the odontoid process of the axis was a small fragment of bone, which might represent a part of the basi- or supra-occiput displaced downwards, or might be the dislocated ring of the atlas. The ex-occipitals articulated with the transverse processes of the atlas, which were long and well ossified. The supra-occiput seemed entirely wanting. The basi-occiput was present, and has been already mentioned. There was no trace of the parietal bones. The great wings of the sphenoid, as well as the pre- and post-sphenoid, were present; but the small wings were either absent or fused with surrounding parts, perhaps with the orbital plate of the frontal; one very crooked pterygoid process was present on each side. The ethmoid was entirely cartilaginous. The superior maxilla contained the dental germs of two incisor, one canine, and three molar teeth. The inferior maxilla was well ossified, and showed a peculiar bony ledge projecting anteriorly below the symphysis menti. The coronoid processes were present, but the condyles were absent. It is evident that the bones which were wanting in this case were almost exactly those developed in membrane; the bones of the base which are preformed in cartilage, and those of the face, were practically all present, although some of them were deformed.

The Vertebral Column (Figs. 1 and 2).—All the vertebræ were represented, although the upper cervical were manifestly imperfect. The anterior part of the ring of the atlas may be fused with the odontoid process or with the basi-occiput, whilst the posterior part of the ring may be represented by the fragment of bone lying behind and above the upper end of the spine. The total length of the vertebral column was 21 cm.; the cervical region measured 3·7 cm., the dorsal 8·3 cm., the lumbar 4·5 cm., and the sacro-coccygeal 4·5 cm. in length. With regard to its curves, the spine showed a distinct convexity forwards in the lumbar region, a concavity anteriorly in the dorsal region and the usual projection of the promontory of the sacrum, and the slightly-marked sacro-coccygeal curve. The dorsal and lumbar curves were probably due to the position in which the body was placed during freezing, but in the cervical region was a state of affairs which could not thus be explained. The cervical part of the spine was curved backwards, so as to develop a marked anterior convexity, and this existed notwithstanding the fact that the chin of the child was in close and permanent contact with the thorax. This fact serves to explain the apparent absence of a neck in this fœtus; for the head, instead of being articulated with the apex of the spine, rather rested upon the anterior surface of the first three or four cervical vertebral bodies. The head had, as it were, slipped down in front of the upper part of the spinal column.

Since the above described arrangement of the cervical part of the spine seemed to have such an important bearing upon the

FIG. 2.—Vertical Mesial Section of Pelvic Region in Anencephalic Fœtus, right face shown (nat. size). A, fifth lumbar vertebra; B, rectum, first part; C, rectum, second part; D, coccyx; E, uterus; F, bladder; G, vagina; H, symphysis pubis; I, clitoris; K, left labium minus; L, right labium.

relation of parts in the anencephalic fœtus, I was anxious to find if it was invariable in this species of monstrosity. So, a few weeks ago, when another specimen of anencephaly came into my hands, I made a vertical mesial section of the head and neck in that case also. In it (Fig. 3) a different arrangement of parts was found to exist. The basis cranii (Fig. 3, A and B) did not run so nearly horizontally as in the first; at its posterior end it bent sharply downwards, so that the basi-occiput lay posterior to the upper cervical vertebral bodies. The cervical region of the spine was curved with an anterior concavity instead of a convexity, and the posterior part of the base of the cranium rested on the posterior instead of on the anterior surface of the upper part of the spinal column. In the first specimen a considerable interval intervened between the anterior aspect of the cervical spine and the back of the pharynx; in the second there was only a very small space in this position. In both cases, however, the neckless appearance was produced, but the manner of production was different. No doubt, both arrangements exist in anencephalic fœtuses, although which is the more common I do not know.

Taruffi (*Storia della Teratologia*, tomo vi. p. 104) figures a case in which the anterior concavity in the upper cervical region was even more marked than in the instance above recorded.

To return to my first specimen, the ossification of the spine was found to be normal in all the regions save the cervical, where there was a well-marked spina bifida (Fig. 1, B). Here the spines and arches of the four first cervical vertebræ were absent, or rather the spines were absent, and the arches were flattened out so as to pass transversely, leaving a wide open space covered by a membrane

FIG. 3.—Vertical Mesial Section of Head of second specimen of Anencephalus (nat. size), right face of section shown. A, sphenoid; B, basi-occiput; C, body of axis vertebra; D, hyoid bone; E, thyroid cartilage; F, septum of nose; G, Eustachian tube; H, tongue.

continuous with that on the basis cranii, and containing blood-clot through which fibrous structures passed up to be inserted into the covering membrane. In the rest of its extent the spinal canal was closed in posteriorly; but it seemed to be unusually large, measuring in the dorsal region 1 cm. antero-posteriorly. The spinal cord was present in a somewhat shrunken form in the dorsal and lumbar regions, but in the cervical only the spinal membranes were seen.

The Region of the Neck.—The reason why the anencephalic fœtus appears destitute of a neck, although the cervical part of the spine is of normal length, has already been described. The hyoid bone (Fig. 1, D) lay above and slightly in front of the thyroid cartilage of the larynx at the level of the seventh cervical vertebra; it was situated 1·4 cm. in front of the spinal column, and the space between it and the thyroid cartilage measured only 1 mm. in breadth. (In my second specimen the hyoid bone (Fig. 3, D) lay opposite the third cervical body, and nearly 2 cm. in front of the vertebral column.) The upper laryngeal opening covered by the epiglottis lay at the level of the body of the sixth cervical vertebra, and the larynx extended vertically from this point to the lower border of

the first dorsal vertebra, a distance measuring 1·2 cm. The thyroid cartilage lay opposite to the disc between the seventh cervical and the first dorsal vertebra, whilst the posterior part of the ring of the cricoid lay opposite the first dorsal body (Fig. 1, E). The antero-posterior diameter of the larynx was 6 mm., and the lower margin of the cricoid was situated 8 mm. above the manubrium sterni.

The isthmus of the thyroid gland (Fig. 1, F) lay in front of the trachea, at the level of the disc between the first and second dorsal vertebræ; it corresponded in vertical extent to the first, second, third, fourth, and fifth rings of the trachea. The upper end of the trachea lay opposite to the lower border of the first dorsal vertebra. A comparison of the levels occupied by the structure in the neck in this case, and in the normal fœtus, reveals an interesting fact; all the parts lie at a lower level *quâ* the spine, in this anencephalic fœtus, than they do in a normal case. The hyoid bone, which normally lies opposite one or other of the upper cervical vertebræ, differing according to the position of the head, lay in this case at the level of the last cervical body; and in a similar way the larynx, the thyroid, gland isthmus, and the upper end of the trachea were all two or three vertebral bodies below their normal positions. The forepart of the head had, as it were, sunk down in front of the cervical part of the spine.

The Region of the Thorax.—The sternum had two ossific centres —one in the manubrium, and one in the body of the bone; it measured 4·8 cm. in length, and it was slightly curved with a posterior concavity. The central tendon of the diaphragm lay at the level of the eighth dorsal vertebra. The vertical diameter of the thoracic cavity in the middle line, from the upper border of the manubrium sterni to that of the central tendon of the diaphragm, was 3·4 cm. The antero-posterior diameter at the level of the third dorsal vertebra was 2 cm.; at the level of the fourth, 2·5 cm.; at that of the fifth, 3·5 cm.; at that of the sixth, 4 cm.; and at that of the seventh, 4·3 cm.

The trachea (Fig. 1, S) extended from the level of the lower border of the first dorsal vertebra to that of the middle of the body of the fifth dorsal, where it bifurcated; it had a vertical measurement of 4·4 cm., and an antero-posterior diameter of from 1 to 2 mm. The upper border of the manubrium sterni lay opposite to the upper margin of the third dorsal vertebra, and at the level of the eighth tracheal ring. In the sagittal section the heart (Fig. 1, H) was divided, the cavities of the right and left auricles being opened into, and the tricuspid valve guarding, the opening into the right ventricle was seen. The valves and apertures of the heart were in the condition in which they are found normally in a fœtus of this age. In vertical extent, this organ corresponded to the fifth, sixth, seventh, and eighth dorsal vertebræ, and it was seen to be tilted upwards in front, so that its apex corresponded to the disc between the seventh and eighth dorsal vertebræ. The

foramen ovale lay at the level of the body of the seventh dorsal vertebra.

The thymus gland (Fig. 1, G), lying in front of the heart and pericardium, extended vertically from the level of the second to that of the lower border of the fifth dorsal vertebra, a distance of 2·3 cm. Its antero-posterior diameter superiorly measured 1·5 cm., and it tapered to a point inferiorly. It had a somewhat triangular shape as seen in section, and at its base it came in contact with the left innominate vein, the trachea, and the thyroid isthmus in the middle line. The lungs were not visible in the mesial section, but dissection revealed them lying at the back of the thorax, unexpanded and small in size. The aorta was seen in the section near its origin from the left ventricle at the level of the fifth dorsal vertebra, and again in the descending part of its course at the level of the sixth, seventh, eighth, and ninth dorsal vertebræ. At the level of the last-named bone it passed through the hiatus aorticus into the abdomen. The ductus arteriosus uniting the pulmonary artery and the aorta was widely patent. The left innominate vein crossed the middle line at the level of the upper border of the third dorsal vertebra.

With regard to the relations of the parts in the region of the thorax, it was seen that the thymus gland, the trachea, the left innominate vein, and the manubrium sterni were all situated at a lower level than is found in the normal fœtus; but the central tendon of the diaphragm lay nearly at the same level with regard to the spine, and the heart in its vertical extent was not far from the normal. The upper limit of the heart corresponded to the fifth, and the lower to the eighth dorsal vertebra, and these are its normal relations in still-born fœtuses. Now, since the organs in the upper part of the thorax are at a lower level, *quâ* the vertebral column, than is normal, and since the heart is practically in its normal position in this respect, it follows either that the organs were smaller or that the thoracic cavity was larger in an antero-posterior or in a transverse direction (for it was really smaller in the vertical direction, as has been shown). On examination it was found that the organs were not relatively small; and with regard to the size of the thoracic cavity, it was discovered that, instead of the vertical diameter in the middle line being slightly greater than the antero-posterior (as it is in the normal fœtus), it was distinctly less. The conclusion could, therefore, be drawn that room had been found for the thoracic viscera by a bulging forward of the anterior thoracic wall; and, since the transverse diameter of the interior of the thorax was twice the length of the antero-posterior, it is probable that further space for the accommodation of the organs was thus made available.

The Region of the Abdomen.—In the abdominal region the section passed slightly to the left of the middle line, and therefore the parts were not divided exactly mesially. The liver (Fig. 1, I), as

is always the case in the fœtus, was a very prominent organ. In vertical extent it corresponded (in the middle line) to the bodies of the ninth, tenth, eleventh, and twelfth dorsal, and first and second lumbar vertebræ, and it was normal in this respect. The greatest vertical hepatic diameter was 5·2 cm., and the antero-posterior diameter at the level of the eleventh dorsal vertebra was 3·4 cm.; both these measurements were made in the middle line of the body. In form the liver was nearly normal, the only peculiarity being that the left lobe was somewhat larger than it usually is in the eight months' fœtus. The stomach had a somewhat narrow tubular form, and lay nearly vertically in the abdomen on the left side of the spine, opposite to the ninth, tenth, eleventh, and twelfth dorsal vertebræ. The duodenum (Fig. 1, L) crossed the middle line at the level of the disc between the first and second lumbar vertebræ. The umbilical cord was inserted into the anterior abdominal wall at the level of the fifth lumbar vertebra.

The pancreas corresponded in vertical extent with the body of the first and the upper half of the body of the second lumbar vertebra. It was at first thought that the spleen was absent in this case, but on dissection it was found packed in alongside of the vertebral column, immediately under cover of the diaphragm; it was very small, measuring only about 2 cm. in length. On account of its small size and its position, it did not possess the same relations to the colon, liver, and stomach as in the normal fœtus. With regard to the small intestine, the duodenum crossed from left to right at the level of the disc between the first and second lumbar vertebræ, and its third part (Fig. 1, N) recrossed the middle line at the level of the third lumbar body. The coils of the jejunum and ileum were found occupying the abdominal cavity at the level of the third, fourth, and fifth lumbar and first sacral vertebræ. The cæcum and ascending colon were not absolutely normal in position; the former lay a little above and internal to its usual site in the left iliac region, and the latter ascended to the neighbourhood of the gall-bladder, where it formed a feebly-marked hepatic flexure, and became continuous with the transverse colon. The ascending and the transverse colon were both greatly distended with meconium, and the latter (Fig. 1, M) had a somewhat unusual arrangement, due in all probability to the absence of the left kidney and to the large size of the left lobe of the liver. The transverse colon passed to the left along the under surface of the quadrate lobe of the liver, then it turned downwards in the abdomen, formed a loop, and then turned sharply upwards, passing to the under surface of the left hepatic lobe, where it formed the splenic flexure. From this point the descending colon passed downwards as a narrow tube, containing little or no meconium, in close contact with the left side of the vertebral column and firmly attached, to become continuous with the sigmoid flexure. The sigmoid flexure, in marked contrast to the descending

colon, was filled with meconium, and was of large size; it made a marked bend at the level of the fifth lumbar vertebra, and became continuous with the rectum, which was like it greatly distended with meconium. The descending colon was, on account of the narrowness of its lumen, in marked contrast with the other parts of the large intestine, which were all over-filled with meconium. There was neither kidney nor supra-renal capsule on the left side of the middle line; but on the right side they were both present, were normal in position, and did not appear to be of greater size than usual.

The bladder (Fig. 2, F) was, as is usual in the fœtus, almost entirely an abdominal organ. Its cavity had an elongated oval shape, with its long axis running almost vertically. In an antero-posterior direction its cavity measured 1·5 cm., and vertically it had a diameter of 3 cm. It contained a few drops of clear urine.

The Region of the Pelvis (Fig. 2).—Lying behind the bladder, and moulded to its posterior wall, was the uterus (Fig. 2, E), which lay partly above and partly below the plane of the brim. The vagina (Fig. 2, G) passed almost directly downwards, having only a slight inclination forwards at its lower end. The ovaries and tubes were normal. The antero-posterior diameter of the pelvic brim, from sacral promontory to upper border of symphysis pubis, measured 3 cm. The rectum (Fig. 2, B and C), distended with meconium, occupied a large portion of the pelvis; it made one bend upon itself opposite to the third sacral vertebra.

The Extremities.—The limbs were well formed. In the lower end of the femur was an ossific nucleus, from 1 to 2 mm. in diameter. There was a large amount of fat in the knee-joint, the infra-patellar pad was of considerable size; there was also a pad between the condyles, and a layer of fat passed backwards upon the head of the tibia. These facts were revealed by a vertical mesial section of the knee. A similar section of the foot showed a centre of ossification in the astragalus, 6 mm. by 4 mm.; and there was also an ossific nucleus in the os calcis, measuring 10 mm. by 8 mm. There was no centre in the cuboid, and that bone was seen to underlie the external cuneiform; and, on further dissection, was found to reach to the inner side of the middle cuneiform, thus indicating what may be held to point to a certain degree of commencing talipes.

To summarise: the important anatomical details in this specimen were—(1), the condition of the bones of the head, the absence of the vault bones, and the deformity of the base bones; (2), the abnormal arrangement of the cervical part of the spine; (3), the displacement downwards, *quâ* the spine, of the soft parts in the region of the neck; and (4), the absence of the left kidney and supra-renal capsule.

The frozen sectional work in connexion with the first specimen was carried out in the Laboratory of the Midwifery Department

in the University of Edinburgh, that in connexion with the second in the Royal College of Physicians' Laboratory.

The Vice-President said the Society was extremely indebted to Dr Ballantyne for giving them another of his Studies on Fœtal Pathology and Teratology. It was not a subject that lent itself to discussion, but they must all have admired the exquisite and life-like drawings he had shown, and must also have all greatly appreciated his clear and concise description of them.

Dr Cullen congratulated Dr Ballantyne on his excellent and painstaking paper. He had an anencephalic fœtus lately, in which he was unable to find any supra-renals. He was astonished at the time, but put the matter down to hasty dissection. He is disposed to think now that they were really absent, especially as such an abnormality seems common in anencephaly. Lobstein and Meckel had noted this fact early in this century. Meckel mentions a case where the left kidney and supra-renal were absent, just as in Dr Ballantyne's fœtus, and the right capsule was very small, though the right kidney was normal. In another case, the supra-renals were both absent and the kidneys were joined together, the left one being much atrophied. Dr Ballantyne had not spoken with regard to the sex in these cases. Morgagni seems to have been the first to point out their relative frequency in female infants. He has been followed in this observation by most authorities up to the present day. Dr Ballantyne mentioned hydrocephalus as being one of the supposed causes of this condition. That it is more probably due to this than to arrest of development is very likely, because of the few specimens to be found in the early months. Anencephaly is almost never seen before the fourth or fifth month. If we suppose a hypersecretive action of central canal of cord and ventricles of brain, as Cleland and others have suggested, then we can readily understand how the head is enlarged and thinned till it and the brain disappear before the secreted fluid. We do not know much of the chemistry of the liquor amnii, but it would be interesting to contrast the analysis of normal fluid with that found in the hydramnios of anencephaly, and to compare that last with the fluid found in spinal canal. It would at once indicate if the increase of liquor amnii was due to the secretion from spinal cord and brain.

Dr Church felt that the Society was much indebted to Dr Ballantyne for this scientific paper, and for all his work on fœtal pathology. Many of the Fellows had not an opportunity for this kind of inquiry. It was interesting to learn that the ancient Egyptians as far back as the time of Moses have handed down specimens helpful in the study of teratology.

Meeting VII.—May 11, 1892.

Professor A. R. Simpson, *President, in the Chair.*

I. *Dr J. W. Ballantyne* exhibited—(*a.*) A specimen illustrating RETARDED DEVELOPMENT OF THE EMBRYO. The history of the case, as supplied by Mr John Helm, one of the students of the Medical Missionary Society, was as follows:—Mrs W., 36 years of age, had been married eleven years, and had been pregnant nine times. Her first pregnancy had ended in a miscarriage at the third month, and this was by her ascribed to a fall. She had had six full-time children, of whom four were still alive, and two had died of bronchitis at the age of two months. Another pregnancy, which occurred about six years ago, terminated prematurely at the ninth week, and this abortion was considered to be the result of a strain through lifting a weight. Her ninth pregnancy began soon after July 5th, 1891, when her last menstrual flow occurred. She had the usual early symptoms of pregnancy, and on October 2nd, whilst she was doing a heavy washing, she noticed some hæmorrhage from the vagina which lasted for two days, then disappeared for about a day, and returned on October 6th, when after some uterine pains an intact gestation sac was expelled. There was no hæmorrhage after the expulsion of the ovum. The woman was kept in bed for a week after the abortion, was regularly douched with antiseptic solution, and recovered quite satisfactorily. She is, at the time of writing (May 1892), at the fourth month of a tenth pregnancy. The gestation sac when fresh measured 7 cms. (2¾ in.) in length, and was a little more than 13 cms. (5¼ in.) in circumference. It was of the size and form of a large hen's egg. The chorion was everywhere covered with the decidual membranes save at the broad end of the ovoid, where the outer surface of the fœtal membranes was laid bare. At the narrow end there had evidently occurred some hæmorrhage into the decidua, for there was a distinct hard mass there to be felt, which when cut into was found to be a blood-clot. The specimen was regarded as a gestation sac from a pregnancy which had reached the term of from two and a half to three months, and it was expected that when the sac was opened an embryo of about 6 cms. in length would be revealed. A slit was made through the fœtal membranes, and about a tablespoonful of liquor amnii escaped; this fluid was somewhat darker in colour than is normal, and was slightly muddy. No embryo was at first seen, but on careful examination one was found lying in close apposition with the internal surface of the sac. It measured scarcely 2 mms. in length, and was therefore the same size as the human embryo obtained by His in 1869, and regarded by him as fourteen days old. The specimen suggested several interesting questions which would be discussed at a future time when a microscopic examination had been made.

(*b.*) A specimen of EXOMPHALOS AND ANENCEPHALY of the fœtus. The case had occurred in the practice of Dr Ballantyne of Dalkeith, to whom he was indebted for the specimen. The following were the clinical details. The patient was at the sixth month of her pregnancy, and when Dr Ballantyne was called to her he found a footling presentation, and noted that there was very considerable hæmorrhage going on. A foot was felt high up in the pelvis, and a bag of waters which was at the time thought to be the membranes of a second fœtus. The infant was quickly delivered by the feet in order to stop the bleeding, and during delivery the bag of waters was ruptured. It was then found that the fœtus was exomphalic, and that what had been taken for a second bag of membranes had been a sac containing the displaced abdominal viscera along with peritoneal fluid. The placenta followed the child almost immediately, and the marked shortness of the umbilical cord explained the bleeding and also the rapid expulsion of the afterbirth. The heart, which was also external to the body cavity, beat for fully a quarter of an hour after the birth of the child. The mother had given birth previously to four healthy children. She was quite healthy and so were the children. She had no maternal impression, and did not anticipate that there would be any abnormality in the product of her last pregnancy, and she suffered from no unusual symptoms during gestation. The fœtus, a female, measured 24 cms. in length. There was complete anencephaly, and spina bifida affected the whole spine with marked retroflexion of the vertebral column. There was also marked exomphalos; no doubt at the commencement of labour the abdominal viscera had been contained in a short sac made up of the peritoneum and amniotic sheath of the cord, but this had been ruptured during labour, and at birth the abdominal viscera were exposed to view. Not only were certain of the abdominal organs (liver, stomach, spleen, large and small intestine, etc.) found protruded from the abdominal cavity, but the heart also was amongst the displaced viscera, for the diaphragm was deficient. There was no separate umbilical cord, for the vessels of the cord ran in the wall of the hernial sac directly to the membranes to be inserted near the centre of the placenta. The length of these vessels was 12 cms. The uterine surface of the placenta was much broken up, and into one or two of the lobules there were hæmorrhages. In diameter the placenta varied from 16 to 13 cms., and was about 2 cms. thick. The fœtus showed a large amount of fat in the subcutaneous tissue. The limbs were strongly flexed.

(*c.*) A specimen of UMBILICAL HERNIA in the fœtus. The clinical history of the case had been kindly furnished him by Dr Thomas Lawson, who had attended the mother of the fœtus in her confinement. The specimen was the product of her tenth pregnancy. She had only carried three children to the full term, the others had been born before the ninth month, and usually at

about the mid-term of pregnancy. In the present case it was calculated that abortion occurred at the 4½ months. She might be said then to have suffered from what is called habitual abortion, and, so far as Dr Lawson was able to learn, there was no suspicion of syphilis. She herself attributed her tendency to abort to the fact that at her first confinement the medical man who attended her was in a hurry, and applied forceps very carelessly. She always had a hæmorrhagic discharge for some weeks before abortion occurred; in this pregnancy it had been going on intermittently for more than a month. Dr Lawson describes her as a "flabby" sort of woman. The fœtus presented by the abdomen, the part felt at the os was the right groin at the spot where the skin was torn. The membranes were ruptured artificially, and a large quantity of grayish-brown liquor amnii escaped. The placenta appeared to be healthy. The fœtus was alive when born, and made lively movement for about five minutes. The child was born independently of the placenta, and was quite separated from it at the time of expulsion. Dr Lawson did not observe at what point the cord had been attached. The fœtus, a male, was 22 cms. in length, and presented a hernia of the umbilical cord which, when opened into, was found to contain the liver. A short fragment of cord was attached to the lower aspect of the hernial sac. The eyelids of the right eye could not be separated, but those of the left could. There was a solution of continuity of skin and subcutaneous tissue in the right inguinal region. In other points the fœtus appeared to be normally formed.

(*d.*) A case of MULTIPLE DEFORMITIES in a fœtus removed by abdominal section from an extra-uterine gestation sac. The specimen had been kindly given him by Dr Brewis, who had performed the operation. The fœtus was 9 cms. in length, and the circumference of the head was 9·5 cms. The head was covered with a whitish non-transparent membrane, and attached to the neck was a piece of thick tissue like sac-wall, which measured 3 cms. by 3·5 cms. Some pieces of fat were attached to the free border of this tissue. Since rupture of the gestation sac had occurred some days before the operation, it was probable that the fœtus had escaped all but the head into the maternal peritoneal cavity, and that it as well as the sac-wall had formed adhesions with the maternal intestines and peritoneum. The right arm of the fœtus was much smaller than the left, and was firmly bound to the side of the thorax by adhesions, the forearm was firmly flexed upon the upper and the hand was curiously contorted, the carpus being dislocated backwards behind the radius and ulna. The left arm was attached to the side by a long thread of membrane. The lower limbs were also deformed; the right leg was bent sharply forwards at the knee, so was the left, and the joints appeared to be anchylosed. Fragments of membrane (prob-

ably adhesions to the mother's intestine) were found attached to the lower limbs. The whole body was contorted, the pelvis being twisted to the left on the vertebral column and fixed in this position. Through an opening at the umbilicus protruded some coils of intestine, and probably the cord had been torn off, for the margins of the opening were sharply marked. The umbilical cord was found in the gestation sac.

(*e.*) A specimen of HERNIA OF THE UMBILICAL CORD in a fœtus about the mid-term of pregnancy, which had been expelled with the gestation sac unruptured, and with a diseased state of the placenta supposed to be syphilitic. The liver and intestines were found in the hernial sac, which was formed of the amniotic sheath of the cord and of the peritoneal membrane. The limbs were curiously contorted.

II. *Dr Underhill* exhibited a MONSTER showing the condition of EXOMPHALOS AND ANENCEPHALOS WITH SPINA BIFIDA. He said the history of the case was curious. The mother, aged 42, was a multipara, her youngest child being 7 years of age. She gradually developed a large tumour, and was sent in from the country to the Royal Infirmary for treatment. During the examination made there the waters broke, and she was sent to the Maternity. On admission a hand was found in the cervix; as there was some bleeding going on the vagina was plugged. He removed the plug twelve hours later, and found a hand in the vagina and the os partly dilated. He turned with great difficulty, as the uterus was contracted on the fœtus, and the os only admitted the fingers—the presence of the umbilical protrusion at first puzzled him and interfered with reaching the feet—but he guessed what the condition was, and at length found and brought down a foot. During these manipulations the cord, which was very thin, was ruptured. The fœtus, however, was dead previously, as the skin was peeling off, and no fœtal heart could at any time be heard. He understood that, as was usual with an anencephalic fœtus, there was a large quantity of liquor amnii.

III. *The President* exhibited a FŒTUS WITH NUMEROUS GRAVE ANOMALIES, which had been sent to him by an old pupil, Dr Edmondson of Ormskirk. The case was one of twins; the first child was well formed and born alive, but there was then hæmorrhage from retention of the placenta. Dr Edmondson on examination found a second child; he delivered the first placenta, and then pulled down what he took to be a leg, but from its deformed character he had some doubt regarding it till he could see the foot. The patient was almost pulseless, and Dr Hanly was sent for; but before his arrival the second child was born. The second placenta was also adherent, and had to be extracted. The mother made a somewhat slow but ultimately complete recovery; she had suffered from bronchitis for some time previously, and was in poor circum-

stances. The well-formed twin died, when about three months old, from bronchitis. The deformed fœtus, a male, showed numerous grave anomalies. The bones of the cranial vault could be felt to be defective, especially the occiput; the nose was flattened out and imperforate; the ears were represented by small apertures without any external ear, and the eyelids of the left eye were imperfect. The skin of the head passed like a cape on to the upper limbs, leaving only the hands free. The thumb and index finger were absent on both sides. There was a ruptured hernia of the umbilical cord. The lower limbs, like the upper, were much deformed. On one foot there were three separate toes, but one of these was evidently three fused together; on the other foot there were three toes. Both the hands and feet were clubbed. The most marked anomaly, however, was shown by the trunk. The whole fœtus was divided into two nearly equal parts: one consisting of head, upper limbs, and chest; the other made up of pelvis and lower limbs, by a deep constriction a little below the level of the umbilicus. The circumference of the body at the level of the constriction was only 12 cms., whilst at the shoulders it was 32 cms. At the constriction no osseous tissue could be felt. The total length of umbilical cord attached to the body was 51 cms. In its first portion it formed a sac for some coils of intestine which were adherent to the sac walls, then its vessels ran in a velamentous fashion in the amnion, and thereafter a true cord was formed.

IV. *Dr J. C. Webster* showed a mounted section of the FEMALE PELVIS AT THE BEGINNING OF LABOUR.

V. *Dr Haultain* exhibited a UTERINE POLYPUS from a patient aged 70. The specimen he thought an interesting one from the history of the case. The patient reached the menopause twenty-five years previously, and had suffered no symptoms of uterine trouble till seven months ago, when she had a large amount of hæmorrhagic vaginal discharge. Since that period the discharge has been almost constant, and five similar growths to that shown had been removed. The uterus is still enlarged, and there are evident signs of polypi yet being present.

VI. THE FEMALE PELVIS IN THE BEGINNING OF THE FIFTH MONTH OF PREGNANCY.

By J. C. WEBSTER, M.D., M.R.C.P. Ed.

CLINICAL NOTE.

The patient suffered from a dermoid tumour of the left ovary, enlarged to about the size of a man's brain by recent hæmorrhage, resulting from a twisted pedicle.

It was removed by Dr Berry Hart.[1] The patient made good progress for a week, but on the ninth day died of cardiac failure.

Method of Study.

The pelvis, as well as the abdomen, was removed from the cadaver intact, and was frozen in the usual manner.[2] A vertical mesial section was cut, drawn and described, after which the contents of the amniotic cavity were removed and a cast of the cavity made in plaster of Paris. A cast of the fœtus was also taken. The specimen was then placed in spirit and studied in detail after a few days.

Vertical Mesial Section. (Plate I.)

Bony Measurements.

Brim.—Conjugate,	Anatomical,	$4\frac{1}{4}$ in.
„	Obstetrical,	4 „
Cavity.—Conjugate,	. .	$4\frac{3}{4}$ „
Outlet.—Conjugate,	Sacral, .	$3\frac{7}{8}$ „
„	Coccygeal,	$4\frac{1}{4}$ „

Vertical length of symphysis is one and a half inches, of sacrum and coccyx six inches.

Pelvic floor projection is one and five-eighth inches.

The umbilicus is opposite the junction of the third and fourth lumbar vertebræ.

Uterus.—Occupies the main part of the pelvic cavity and extends also above the brim. It is in close contact with surrounding structures. Above the brim the anterior wall lies against the abdominal parietes and higher up against intestine. The fundus and upper part of the posterior wall are also in relation to intestine. The highest point of the uterus is two and three-quarter inches above the brim. Below the brim the anterior wall presses against the pubes and the upper wall of the bladder, the posterior wall touching from above downwards the upper part of the sacrum, the upper part of the rectum, and a dermoid tumour of the right ovary which lies in the pouch of Douglas.

The lower part of the cervix is in close contact with the vaginal walls.

The *os externum* is four inches below the brim, and the *os internum* three and one-eighth inches.

The vertical mesial circumference of the whole uterus is sixteen and a half inches.

The *body* is of firm consistence and of a pink-gray colour, that part with the placenta being slightly darker. On close examina-

[1] To Dr Hart's great kindness I am indebted for the specimen.

[2] *Lab. Reports*, vol. ii. p. 3.

tion the muscle shows a finely striated appearance, chiefly in a longitudinal direction. Several closed vessels are seen in the upper portion of the body, being especially numerous opposite the placenta. In the lower portion of the body very few vessels are seen.

Though there is no definite point at which the body can be divided into an *upper* and *lower uterine segment*, it is very evident that this distinction can be made out—the upper portion of the uterine wall being considerably thicker than the lower portion, the passage from one to the other being gradual. On the anterior wall the difference is best marked, the point of division being about four and three-quarter inches above the cervix, or one and a half above the symphysis; on the posterior wall the change takes place lower down—about three-quarters of an inch nearer the cervix.

The average thickness of the *upper uterine segment* is nearly half an inch; that of the *lower uterine segment* being in the anterior wall three-sixteenths, and in the posterior one-quarter. Near the cervix both walls thicken slightly as they pass into the cervix.

The *cervix* is darker in colour and coarser in texture than the body, being an inch in length. The anterior and posterior walls are in apposition at the lower end of the canal, but in the rest of its extent slightly separated, the upper end of the canal being funnel-shaped; it contains mucus. Both walls are of much the same thickness, the posterior being, if anything, slightly thicker.

The *placenta* is on the anterior wall, being mostly on the *upper* but partly on the *lower uterine segment*. It is of a dark red-purple colour. It is three-quarters of an inch in its greatest thickness—just above its centre; it thins more markedly towards the lower end.

The *membranes* are seen as a thin lining on the wall of the uterus and crossing the os internum.

The *liquor amnii*, the cord, the arms, and thorax of the fœtus cut transversely, are well shown.

The *peritoneum* in front descends to a point two and three-sixteenth inches below the brim, and behind three and one-quarter below it.

Over the *lower uterine segment* anteriorly it is loosely attached, but posteriorly it is closely attached, just as it is to the upper uterine segment.

The *bladder* is empty. It lies partly above, partly below the conjugate of the outlet. The upper surface is concave and in relation with the anterior uterine wall. It is in front closely attached to the back of the pubes, there being no well-defined retropubic triangular pad of fat between them. A thin layer of fat covers the anterior portion of the upper surface, and is continuous with a well-marked layer passing upwards to the abdominal wall. The upper wall below the utero-vesical pouch is

connected to the uterus by very loose cellular tissue. The cavity is a mere slit.

The *urethra* lies entirely below the outlet; it is sigmoid-shaped, one and three-eighth inches in length. The junction of urethra and bladder lies three inches below the brim.

The *vagina* has much less of the sigmoid curve than it normally has. The anterior and posterior walls are in apposition, save near the vulva.

The *rectum* is divided from the anus as far as the lower end of the sacrum. A small section of the upper portion of the gut is also seen near the lower end of the first sacral vertebra.

On examining the specimen, after it had been a few days in spirit, further information was gained.

The *uterus* is slightly nearer the right than the left side of the pelvis in its upper part.

The *bladder* slopes from below upwards and to the right, the highest point not being seen in vertical mesial section, being one and a half inches to the right of the symphysis and a quarter above the brim.

The *left broad ligament* cannot be well described, owing to the contraction of the upper part as a result of the removal of the left dermoid ovarian tumour.

The *right broad ligament* in its upper part is somewhat dragged downwards by the right ovarian tumour.

The *right dermoid ovarian tumour* is about the size of a turkey's egg, and lies in the pouch of Douglas, being compressed from before backwards. It contains the ordinary yellowish, fatty-looking contents, with hair, skin, and a few small bones, and from its plasticity is made to appear somewhat flattened between the uterus and the sacrum. No normal looking piece of ovary could be detected, neither was any *corpus luteum* to be found.

Cast of Amniotic Cavity. (Plate II.)

The cast was taken after the fœtus and liquor amnii had been removed, the placenta and membranes being left *in situ*.

Viewed from the front and back it has the general shape of a pear flattened from before backward, the broad end being lowermost. Viewed from the side it is also pyriform, the sides being compressed from before backwards; the anterior surface is markedly convex, the posterior slightly convex below and concave in its upper part. The small antero-posterior diameter of the upper part is due to the flattening of the upper part of the uterus from before backwards, and also to the space occupied by the placenta on the upper part of the anterior wall. The left half of the cast is thicker than the right.

The posterior surface shows a flattening in its lower part chiefly on the right side, caused by the dermoid tumour in the pouch of

Douglas; in its upper part is seen a hollow due to the pushing inwards of the uterine wall by the promontory. On the anterior surface is seen the mark of the placenta occupying somewhat less than half the area of the surface; it is oval in shape, the long axis being almost vertical and measuring four and a half inches, the transverse measuring three and a quarter, while the circumference measures twelve and a quarter.

The water displacement of the whole cast is 610 c.c. The surface-area of the whole cast is about sixty-five square inches. The placental area measures about eleven and three-quarter inches.

Cast of Fœtus.

The parts of the frozen fœtus removed from the amniotic cavity were placed together, and cast in plaster. The attitude is one of flexion, though not of extreme degree, the limbs showing a considerable degree of extension at all the joints. The water displacement of the cast is 210 c.c.

Résumé.

The *pelvic floor projection* is one and five-eighth inches. If this be compared with the projection in other cases, we find that it is greater than in the nulliparous condition, and less than in the later months of pregnancy.

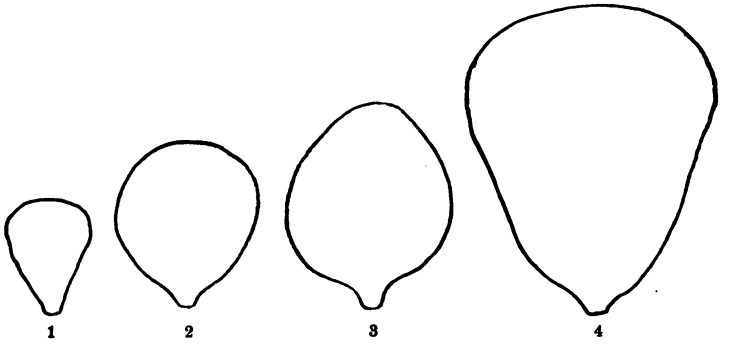
Stage.	Whose Case.	Pelvis floor Projection.	Skin-distance from Coccyx to Symphysis.
Nullipara, . . .	Average, ...	1 in.	5¼ in.
Five months' Preg.,	Webster, ...	1⅝ „	5⅞ „
Eight months' „ .	Barbour and Webster,	2 „	6½ „
Nine months' „ .	Braune, ...	3¼ „	10 „
„ „ .	Braune and Zweifel, .	2¼ „	7½ „

The uterus has the following characteristics worthy of note. Its longest diameter is the vertical, which measures from os externum to fundus about seven and three-quarter inches; the greatest width is five inches; and the greatest antero-posterior diameter four inches. In the frozen state there is seen to be a flattening of the uterus from before backwards. In its upper part this is evidently due to the pressure of the anterior abdominal wall, and in the lower to the presence of the dermoid tumour in the pouch of Douglas. The irregularity of outline of the wall is due to the pressure of neighbouring structures against it, chiefly the symphysis and promontory.

The cast of the cavity shows these points, and also brings out the fact that the uterus near the fundus, in both its transverse and

antero-posterior diameters, is smaller than that part situated just above the cervix. When the parts were examined after thawing took place, the pressure of the anterior abdominal wall being removed, it was found that, when viewed from the side, the antero-posterior measurements of the upper and lower poles of the uterus were more nearly equal than they appeared to be in the frozen state. The fact that the upper portion of the uterus is not of larger bulk than the lower is worthy of note.

At the beginning of pregnancy the pyriform shape of the uterus,



OUTLINE OF UTERUS SEEN FROM THE FRONT.

1. At the beginning of pregnancy. 2. During the third and fourth months. 3. At the beginning of the fifth month. 4. At the end of pregnancy.

with its wide upper and narrow lower portion, is well recognised. A similar shape is again found late in pregnancy, as frozen sections and casts made by Dr Barbour and myself show.[1] It is also usually taught that, after the very early months, the uterus becomes spherical in shape. In this five months' case the uterus is neither spherical, nor pyriform as in the later months. It seems, indeed, to be in an intermediate position. The longest diameter is the vertical one. The antero-posterior diameter is greatest just below the middle of the body. Of special interest, however, is the shape of the body as seen from the front. It differs from the pyriform and spheroidal shapes of the early months, as well as from the pyriform of the late months; it has indeed a pyriform appearance, with, however, *the widest part lowermost* and not uppermost, as is the case in the late months. The foregoing diagrams represent the uterus as seen from the front at various stages of pregnancy.

Whether this is the normal shape at the beginning of the fifth month can only be demonstrated by frozen sections and casts of other cases. In this case it is possible that the presence of the tumours may have somewhat modified the growth of the

[1] *Lab. Reports*, vol. ii. p. 1.

uterus, though one cannot definitely settle this point. Even, however, allowing for the pressure on the lower uterine segment by the small tumour in the pouch of Douglas, it is evident that the transverse diameter of the upper part of the uterus is at least *not greater* than that of the lower part (thus differing greatly from the condition in early and late pregnancy). There seems, indeed, to be no doubt that in this case the lower diameter is wider than the upper.

If the uterus be compared with that of an eight months' pregnancy case,[1] it is evident that there is a marked preponderance in size, in the latter, of the upper portion of the uterus over the lower; in fact, the casts seem to show that, from the beginning of the fifth month onwards, the increase in size of the uterus takes place almost entirely in its upper portion.

The differentiation of the wall into lower and upper segments is well marked. It is, indeed, much better defined than in the other frozen sections of pregnant women already published. In the latter (which are in the late stages of pregnancy), the upper uterine segment is much thinner than in the present case. Here the thickness of this part is about the same as the wall of the non-pregnant uterus. As regards the lower uterine segment, this case agrees with the others in having that of the anterior wall thinner than the posterior, but differs from them in the great extent to which it is developed. Anteriorly, the apparent junction of the upper and lower segments is more than four inches above the cervix (at this point there is a sinus in the wall—? circular sinus); below this level the peritoneum is loosely attached, while above it, it is very firmly attached. Posteriorly, the lower uterine segment is not so well marked off from the upper; the peritoneum covering it is firmly attached save in the lowermost portion.

In none of the other published cases is the lower uterine segment of such a length as in this case. In a uterus at full time, described by Bayer,[2] it measured three and one-eighth inches (8 c.c.); in another it measured three and one-sixteenth (7·5 c.c.). Hofmeier[3] has also found it to measure two and three-quarters (7 c.c.) in two full-time cases.

Is the extreme degree of development of the lower uterine segment in this case abnormal or only unusual? In Barbour's table,[4] describing all the uteri in which the segment has been described, the greatest variations are found to exist. For example, in Benckiser's four months' case, the firm attachment of the peritoneum is one and three-eighth inches (3·5 c.c.) above the cervix, whereas in Bayer's it is opposite the upper end of the cervix. There is no reason to doubt that the present condition is but one of many variations found.

[1] *Lab. Reports*, vol. ii. p. 7.
[2] *Morph. d. Gebärmutter*, 1885.
[3] *Das untere Uterinsegmentes, etc.*, 1886.
[4] *The Anat. of Labour, etc.*, 1889.

Possibly the firm attachment of the peritoneum may not mark the upper limit of the segment, though, indeed, it is exactly opposite the junction of the thick upper and thin lower uterine segments. In some cases described by Bandl, it was a little above the upper end of the lower segment.

It is possible, also, that the uterine wall to which the lowest bit of the placenta is attached is not lower but upper segment, and it may be only the commencement of the thinning of that part of the wall because of the placental attachment. In the other frozen sections the placental part of the wall is much thinner than in the present case. Allowing for this possible explanation of part of the thinning, there would still remain a lower segment of exceptional length—*the longest of any recorded case.*

It is very evident that the cervix does not enter into the formation of the lower segment; it is of much the same size as in the nulliparous condition. A careful study of all the vertical mesial frozen sections in published cases shows that in the later months the cervix is as large as in the early period, being only somewhat compressed from above downwards, so that it appears slightly shorter and thicker. This condition is chiefly due to the pressure of the softened uterus against the sacral segment of the pelvic floor; the softening becomes even more marked as pregnancy advances. Owing to the continued hyperæmia there may even be some increased growth.

Much of the discussion as to the relation of the cervix to the lower segment has arisen from the study of uteri removed from the body; in this way flattening of the cervix occurs, so that its normal shape is completely altered. Moreover, a microscopic study of the mucous membrane cannot decide the question; the passage of the cervical mucous membrane into the decidua of the lower segment is not abrupt but gradual, and no well-defined os internum can be made out. Of much greater value is the examination of the muscular tissue, that of the lower segment being arranged in a series of plates, mostly longitudinally arranged, that of the cervix being a felted network of bundles.

The *peritoneum* has a somewhat unusual arrangement. In front, the bottom of the utero-vesical pouch is not as low in relation to the cervix and bladder as is generally the case; behind, also, the bottom of the pouch of Douglas is above the level of the posterior fornix, not reaching down between the rectum and upper part of the posterior vaginal wall as it does in the great majority of cases. The dip of the utero-vesical pouch below the brim is two and three-sixteenths inches, and that of the pouch of Douglas three and a quarter. If these measurements be compared with corresponding ones in the nullipara, there is found to be very little difference.

The peculiarity in this case is not that the pouches are unusually high, but that the uterus is exceptionally low in the

pelvis. It is probable that the peritoneum has not descended with the uterus as the latter has sunk down, and has been consequently separated from its lowest attachments. The tissue below the utero-vesical pouch, between the bladder and lower uterine segment, is very delicate and loose, and would easily allow of this separation.

The reflection of the peritoneum, from the anterior abdominal wall to the bladder, is exceptional. In most nulliparous cases, the highest point of the bladder is in the middle line, either above or below the upper margin of the symphysis, the outer edge sloping downwards and outwards on each side behind the pubic bones.

In this case, however, the bladder is inclined obliquely from below upwards and to the right, the highest point being a quarter of an inch above the brim, and one and a half to the right of the symphysis.

The disposition of the pelvic peritoneum during pregnancy has not yet been definitely settled. Regarding its lateral arrangement it is clear that, during the progress of gestation, as the uterus increases in its transverse and vertical diameters, the peritoneum on each side of the pelvis is considerably elevated. This has been well demonstrated by Barbour and Polk.

Regarding the arrangement in front and behind, there is considerable uncertainty. Polk[1] declares that the peritoneum is lifted up so that (while in the non-pregnant condition a line drawn from the centre of the symphysis to the junction of the third and fourth sacral bones corresponds to its lowest portion in front of the uterus and behind, except the pouch of Douglas) at the end of pregnancy, and before the uterus has fallen, its lowest level (excepting the pouch of Douglas) is at a line from the centre of the symphysis to the promontory.

This statement is not in accord with the evidence furnished by frozen sections. Polk formed his conclusions from dissectional work—an unreliable method in determining topographical relationships, especially in investigating pregnancy, because, owing to the increased softening of the pelvic tissues in that condition, they are very readily stretched and compressed, the normal position of parts being easily altered.

Most of the frozen sections of nulliparæ show that the peritoneum reaches a lower level than that indicated by Polk.

In regard to the changes during pregnancy, though we cannot speak with absolute certainty, owing to the lack of a sufficient number of frozen sections, yet we have sufficient facts at our disposal to disprove the statements made by Polk and others. Variations are doubtless found, just as in the nulliparous condition. If we measure the dip of the peritoneal pouches below the brim of the present five months' case, in Barbour and

[1] *New York Med. Journ.* vol. xxxv. p. 560.

Webster's eight months' case, and in Braune's full-time case, we find that the pouches are as low as in the nullipara, or even lower. In a sixth months' case of Barbour's (unpublished) it is three-quarters of an inch lower (I leave out of consideration the full-time cases of Waldeyer, and Braune and Zweifel, the first having a fractured pelvis and the other an unusual arrangement of the bladder).

The changes in the anterior attachments of the peritoneum during pregnancy have always been described in relation to the uterus and the bladder. The growing uterus elevates the peritoneum, it is usually said, stripping it from the bladder; the pouch of Retzius, therefore, as well as that of Douglas, must reach a higher level as pregnancy advances. This conclusion is contradicted, we find, by frozen sections.

As regards the stripping of the bladder, we find, certainly, that this does take place in pregnancy, though, as the sections show, the amount varies in different cases. From a study of the frozen sections, it seems to me that the hitherto attributed cause, viz., the elevation of the peritoneum by the growing uterus, is not the main cause. The growth-changes in the uterus in the latter half of pregnancy, as I have already indicated, affect chiefly its upper and not its lower part. It is difficult to see how these changes can disturb the peritoneal relations of the pouches of Douglas and Retzius. The explanation is rather that the bladder is stripped away from the peritoneum by the sinking of the pelvic floor; owing to the very delicate loose connective tissue joining the bladder and peritoneum, the latter does not follow the posterior part of the former in its downward descent.

Usually the bulging of the floor is most marked near the end of the pregnancy, and Waldeyer's and Braune's sections show a great part of the bladder uncovered. In Barbour and Webster's eight months' case, where the bladder is not so pushed down, there is scarcely any stripping of the peritoneum. In this five months' case, where the bladder is very low, a considerable portion has lost its peritoneum.

The variations that are found in the different cases may have normally existed in the non-pregnant condition, but they are, no doubt, partly due to the fact that the peritoneum of the utero-vesical pouch is more or less folded in different cases. Whatever be the cause of the stripping of the bladder, the extent of the stripping must depend upon the number and size of these folds to be unfolded.

As regards the pouch of Douglas, there is no elevation in its central portion throughout the whole pregnancy.

The explanation of the low position of the uterus is not evident. The frozen sections of full-time cases show as much sinking, while in the eight months' case it is nearly as low. It is usually taught that this extreme degree is only normally met with at the end of

gestation. It may be that the sinking is progressive from about the middle of pregnancy, being, in some cases, very marked long before term. In this case, it must not be forgotten, the presence of the tumours may have something to do with the low position.

The co-existence of pregnancy and double ovarian tumour, though rare, has been noticed in several cases. Sometimes, as here, it is impossible to find ovarian tissue, while no corpus luteum may be found.

Bibliography.

Barbour.—1. *The Anatomy of Labour and its Clinical Bearings.* Edinburgh, 1889.

2. *Atlas of the Anatomy of Labour.* Edinburgh, 1889.

Barbour and Webster.—"Anatomy of Advanced Pregnancy and of Labour," *Lab. Reports, R.C.P.Ed.*, 1890.

Bayer.—*Morphologie d. Gebärmutter, etc.* Strassburg, 1885.

Bandl.—*Ueber d. Verhalten d. Uterus u. Cervix in d. Schwangerschaft u. wahrend d. Geburt.* Stuttgart, 1876.

Benckiser.— *Zur Anat. d. Cervix u. unteren Uterinsegmentes, etc.* Stuttgart, 1887.

Braune.—*Die Lage d. Uterus u. Fœtus am ende d. Schwangerschaft.* Leipsic, 1872.

Braune u. Zweifel.—*Gefrierdurchschnitte durch den Körper e. Hochswang. geführt.* Leipsic, 1890.

Hofmeier.—*Das untere Uterinsegmentes in Anat. und Physiolog. Beziehung.* Bonn, 1886.

Polk.—"Observations upon the Anat. of the Female Pelvis," *N. Y. Med. Journ.* vol. xxxvi.

Waldeyer.—*Medianschnitt einer Hochschwangeren, etc.* Bonn, 1886.

DESCRIPTION OF PLATES.

Plate I.

a. Level of umbilicus.
b. Fundus uteri.
c. Placenta.
d. Liquor amnii.
e. Venous sinus.
f. Umbilical cord.
g. Symphysis pubis.
h. Utero-vesical pouch of peritoneum.
i. Bladder.
j. Promontory.
k. Junction of upper and lower uterine segments of posterior wall of uterus.
l. Bit of rectum.
m. Arm of fœtus.
n. Dermoid tumour of right ovary.
o. Fœtal heart.
p. Pouch of Douglas.
q. Rectum.
r. Os internum.
s. Os externum.
t. Anterior fornix.

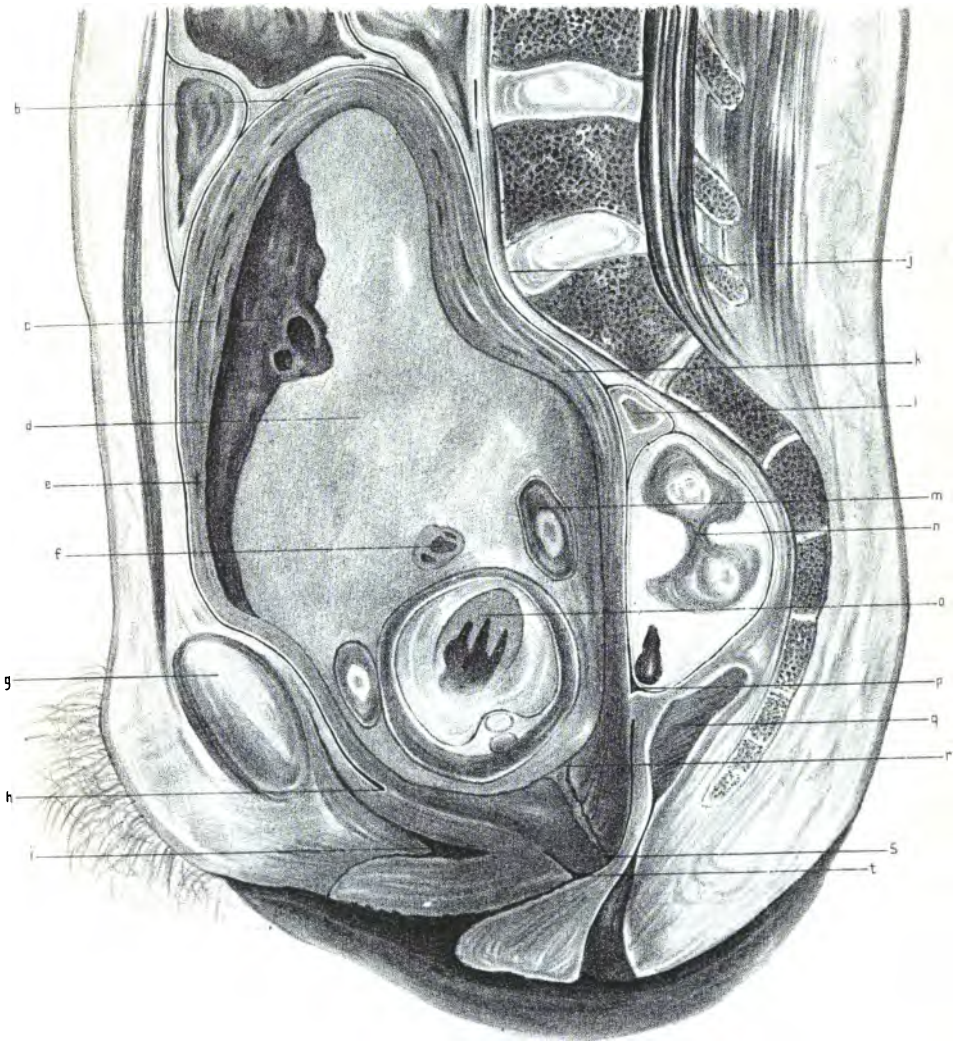
Plate II.

Cast of Amniotic Cavity.

1. Seen from the front.
a. d. Fundus uteri.
c. f. Os internum.

2. Seen from the left side.
b. Placental area.
e. Promontory mark.

PLATE I.



Vertical Mesial Section of the Pelvis at the beginning of the Fifth Month of Pregnancy (×).

FIG. 1.

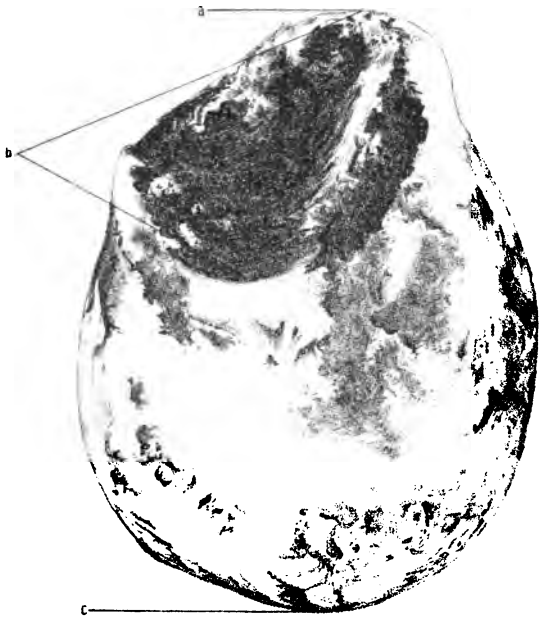
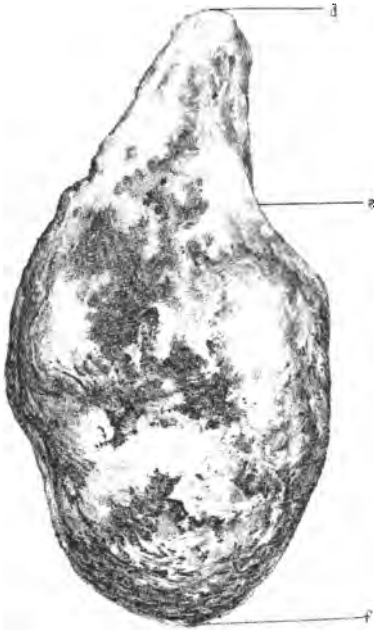


FIG. 2.



CAST OF AMNIOTIC CAVITY.

1. Seen from the front. 2. Seen from the left side.

a, *d*. Fundus uteri. *b*. Placental Area.

c, *f*. Os internum. *e*. Promontory mark.

PLATE II.

The President remarked on the value of Dr Webster's communication, which did not lend itself much to discussion, but which would prove a very notable contribution to our knowledge of the pregnancy changes in the uterus and the other pelvic viscera. There were many of the debateable points on which this research would give important information. In regard to the lower uterine segment, for instance, this case seemed to confirm the opinion that was gradually becoming established, that the cervical canal did not open from above to receive the ovum during pregnancy, though Dr Webster had indicated that the line of demarcation between the mucous membranes of cervix and uterus was not so well defined as some had been disposed to allege. That the question was not finally answered was shown in a recent paper by Keilman, who from study of changes in the gravid uterus of the bat was able to trace how in that animal the upper part of the cervical canal expanded during pregnancy to receive a portion of the ovum. He (the President) regarded also the observation as to the mode in which the bladder became to some extent denuded of peritoneum as of special value, and thought that Dr Webster's explanation was likely to be correct, all the more if we kept in view the firmer attachment of the peritoneum to the anterior abdominal wall than to the bas fond of the bladder, and remembered how the growing mass of the uterus tended to stretch the abdominal walls outwards and upwards in all their thickness from the striated skin to the tense peritoneal lining. The paper altogether was one of exceptional interest and value.

Dr Berry Hart thought Dr Webster's paper supplied a valuable link in the series of preparations. He himself had never believed in the raising of the peritoneum during pregnancy—it was a labour phenomenon.

VII. PEDUNCULATED UTERINE GROWTHS: A Practical *Résumé* of a Series of Cases.

By F. W. N. Haultain, M.D., F.R.C.P. Ed., Lecturer on Midwifery and Diseases of Women, Edinburgh School of Medicine; Obstetrician and Gynæcologist, Royal Dispensary, Edinburgh.

Having within the last nine months had under treatment four patients suffering from intravaginal pedunculated uterine growths, each of which represented a distinct type of neoplasm, I bring before you a short account of the cases and a description of the structural character of the tumours, which I hope may be of interest both from a clinical and a pathological standpoint.

Stalked growths of the uterus, though not infrequently met with, cannot be reckoned as of common occurrence,—thus, for instance, in Ward 28, Royal Edinburgh Infirmary, during the last six years only twenty-two cases are recorded: of these seventeen

were examples of fibromata, the remaining five being mucoid. The four cases which directly came under my care may be shortly cited as follows.

CASE I.—Patient, aged 52, complained of continuous fœtid sero-sanguineous discharge and bearing-down pains which had lasted four years, and had reduced her to an extremely weakly and anæmic state. She had always been regular but rather profuse in her periods. Three years previously cancer of an extremely rapid type had been diagnosed, and her demise assured as being

FIG. 1.—Polypoidal Fibro-Sarcoma of Cervix Uteri (from Specimen full size).

merely a matter of a few months at the longest. Having anxiously and expectantly waited these three years without any apparent more immediate approach of the inevitable, she was advised to seek further advice. Upon being asked to see her, I found the vagina to be blocked by a large ulcerated mass, smooth and free at its periphery, and quite movable; with difficulty I succeeded in getting my fingers above the tumour, and found it to be slightly attached to the anterior cervical lip, and by twisting the tumour round 1½ turns the thin attachment was severed, and delivery of

the tumour accomplished. This latter proved to be the most difficult part of the operation, and a slight laceration of the perineum was caused by its performance. Antiseptic douching formed the after-treatment, and from that day to this (seven months) the patient has not lost another drop of blood per vaginam. The polypus proved to be a pedunculated submucous fibroid.

CASE II.—Patient, aged 60, menopause at 44, complained of a red vaginal discharge which had lasted off and on for eight months; she also suffered from vesical symptoms, constipation, and an intense bearing-down pain.

On examination a large lobulated mass was found growing from the posterior lip of the cervix, attached by a pedicle of about $\frac{3}{4}$ inch thick.

The tumour was removed by chain ecraseur, and great difficulty was found in controlling the hæmorrhage—a styptic vaginal plug being a *sine qua non*. The patient made a good recovery, and three months after the operation, on local examination, showed no return of the growth; she has, however, unfortunately left for America, and is, I am afraid, quite removed from observation. (Fig. 1.) The tumour, as I show you, has a lobulated, almost hepatic appearance; its consistence is soft, while its free surface is smooth and free from ulceration, and its pedicle to the naked eye shows numerous large patent bloodvessels, from which one can well appreciate the significance of the statement already made, that the hæmorrhage after removal was with difficulty controlled.

Microscopically the tumour may be seen from specimen before you to be a sarcoma, composed of numerous oat-shaped cells, with a surrounding matrix of fine fibrillæ, through which coursed numerous fairly-formed bloodvessels. The pedicle was formed by well-marked bundles of muscular tissue, between which ran large patent bloodvessels, but in the tumour itself no muscular fibres could be seen, while no evidence of sarcoma cells was found in the pedicle. A thin fibrous layer covered the various lobes of the growth.

CASE III.—Patient, aged 33, two children, complained of vaginal hæmorrhage which had lasted continuously for six weeks; before then menstruation had been quite regular and normal. As a polypus was diagnosed I was asked to remove it, and on proceeding to do so I recognised that the growth, though markedly pedunculated and growing from the post cervical lip, was softer and more hæmorrhagic than is usual with these tumours. I therefore decided to use the galvanic cautery for its removal,—a decision I by no means repented of, when I examined the divided pedicle.

Upon examination the growth had a mushroom-like appearance

(Fig. 2); its lower surface was rough and irregular, and composed of friable tissue, while the upper surface was smooth and continuous with the pedicle. Upon microscopical examination it proved to be a soft rapidly growing carcinoma, infiltrated with leucocytes, as shown in the accompanying section under the microscope. The pedicle was formed of fibrous tissue with large drawn-out patent bloodvessels with muscular coat absent, but not a trace of epithelial cells could be found.

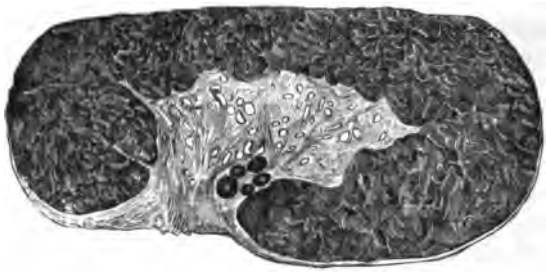


FIG. 2.—Section through Carcinoma of Cervix Uteri, showing its markedly pedunculated character. Light shading shows vascular pedicle, dark shading shows epithelial growth.

A week after the operation the patient suddenly was seized with abdominal pain, and to our surprise was delivered of an ovum of about 4 months' growth. She, however, made a good recovery, and as yet (after six months) shows no recurrence of the disease.

CASE IV.—Patient, aged 34, complained of constant hæmorrhage from vagina, which had lasted for six weeks. She had been profuse in her periods for nine months, and suffered from severe leucorrhœa and pain in back and bearing down. On examination a small growth about ¾ of an inch long and about the thickness of an ordinary lead pencil was found growing from the mucous surface of the cervix about ¾ inch from os externum, through which it protruded. Attempts to remove by twisting proved unsuccessful, and a wire snare was eventually required. After removal the hæmorrhage, pain, and leucorrhœa ceased. The growth on microscopic examination was found to consist of a central mass of extremely close fibrous tissue, covered by many layers of horny squamous epithelium, while opening on the free surface were numerous glands lined by extremely long columnar cells secreting mucus.

Independently of their clinical significance, concerning which this communication is chiefly intended, the pathological characters of the growths described are extremely interesting. They simulate each other in but one character, their pedunculation; otherwise they represent four distinct varieties of neoplasm, viz.:—Fibro-myoma, sarcoma, epithelioma, fibro-adenoma. The relative fre-

quency of these tumours is extremely varied; thus the fibro-myomata form about 70 per cent. of all pedunculated uterine growths, while the adenomatous or mucous variety account for by far the greater proportion of the remaining 30 per cent.: the pedunculated variety of carcinoma being unfortunately but too rare, while sarcomata of any type are by no means common.

Fibroid polypi, although forming such a large proportion of the pediculated growths, are only met with in about 16 per cent. of fibroid uterine tumours; thus it must be at once apparent that pediculated uterine growths, though by no means rare, cannot be classed as by any means frequent. The microscopic characters of the small growth removed from Case IV. are of much pathological interest. To accurately and succinctly classify it would seem to me to present great difficulty. From its dense fibrous basis it differs in a marked degree from the ordinary structure of a mucous polypus, while its epithelial and glandular covering distinctly remove it from the category of the fibroids. Its covering of squamous epithelium is also interesting when we consider that the growth was distinctly intra-cervical. This peculiarity has already been shown by Underhill.

In considering the clinical features of these pedunculated growths I have described, it will be apparent that they were all associated with watery vaginal discharge, menorrhagia and metrorrhagia; in the case of the small fibro-adenomatous growth this was almost as severe as in the malignant varieties,—vaginal discharge, therefore, with hæmorrhage may be said to be their constant characteristics. The hæmorrhage is out of all proportion to the size of the tumour, and would appear in the benign varieties to be due to a congestion of the uterine body, the cavity being in all cases lengthened. In Case III. the bleeding necessarily arose from the ulcerated surface of the growth, discharge from the uterus being prevented by its gravid state. The large number of extravasated leucocytes in the tissue of the cancer is, I think, of much value in showing how pregnancy from increasing the vascularity of the tissue must tend to hasten the course of the disease, and opens up an important field for discussion as to whether, in cases of cancer occurring with pregnancy, the uterus should not be emptied as soon as possible, so that the disease may be treated without delay, and further rapid advancement prevented, even though absolute and entire removal of the growth is impossible.

The continuation of menstruation long after the usual climacteric age is a frequent symptom of the benign group of uterine growths, but the pedunculated varieties tend more than others to an excessive discharge, which rapidly undermines the constitution of the patient. Out of eighteen cases which were directly under my own observation in Ward 28, ten were in women over fifty years of age, in all of whom the climacteric has not yet been reached; one of these is particularly interesting, the patient being fifty-six years old, whose

symptoms were entirely due to an intra-cervical mucous polypus not so big as a marble.

Although delaying the menopause, these benign growths are extremely seldom the cause of renewal of hæmorrhage after the climacteric has been reached, this symptom being, one might say, almost the absolute property of malignant affections of the pelvic organs. But as in most rules there are exceptions, the specimen I have already shown to-night corroborates.[1] From this symptom of post-climacteric hæmorrhage being present in Case II., I felt certain we had to deal with a malignant tumour, and therefore recommended its immediate removal. Unfortunately, however, malignant disease of the uterus is but too common before menstruation ceases, and therefore this method of differential diagnosis becomes much restricted in value.

A further point of importance in regard to these pedunculated growths, if cervical, is the circumstance that they may mask the usual signs and symptoms of pregnancy. Naturally sterility, or at least early expulsion of the uterine contents, is the condition generally met with, but should a pregnant condition be maintained, the absence of amenorrhœa prevents any suspicion of its persistence. Thus in Case IV. no idea of the patient's pregnant condition was thought of until expulsion of the uterine contents had commenced. The case is therefore of much value and interest, if it be but in alone offering another grain to the weight of evidence in favour of the rule so rigidly taught in this school, and which admits of no exception, "always to examine pelvic organs bimanually."

As a direct antithesis to the assertion just made, that the symptoms of pregnancy are frequently masked by polypi, two cases may be incidentally here mentioned that came under my notice in Ward 28, Royal Infirmary, Edinburgh, in which there was associated with a mucous polypus such a secretion of milk that the patients believed themselves pregnant from that sign alone; in both these cases, after the removal of the growths the secretion of milk subsided. That the symptom occurred in two different cases would seem to make it of more interest than a mere coincidence, but I have failed to find any reference to a similar condition in the literature of the subject.

The points of differential diagnosis between an ordinary fibroid polypus with its smooth surface and the rough cauliflower cancer are so well marked that reference to them is unnecessary, but a very different state of matters exists when the capsule of the fibroid polypus has become ulcerated. The conditions now become very similar both as regards symptoms and signs; the fœtid discharge, the cachexia, and the rough ulcerated surface of the tumour,

[1] Dr Haultain showed a specimen of a fibro-adenomatous polypus removed from a patient, aged 70, which had caused much hæmorrhage for the previous 7 months.

are common to both, and it is only by thorough and careful manipulation that a distinction is to be made out. For this purpose there are two points which require special notice, the first being the smooth upper surface of the fibroid polypus, and, secondly, the ease with which it can be twisted. The smooth upper surface of the fibroid polypus, where no ulceration of the capsule exists, is an extremely satisfactory means of differentiating it from the ordinary soft papillary form of cervical cancer (cauliflower growth), but in the cancerous case I have just cited (mushroom growth) no such difference existed. The rotatory mobility of ulcerating fibroid polypi is, I consider, one of the greatest practical importance in their diagnosis, and is usually due to the fact, that before an intravaginal uterine polypus becomes ulcerated, its pedicle is, as a rule, extremely small; on the other hand, malignant growths being nourished through their pedicles are firmly attached, and therefore difficult to rotate,—in fact the ulceration in the malignant growth may be said to be due to an excess of growth and vitality, while in the fibroid it is a process of death and decay. I have, perhaps, dwelt unnecessarily long on the subject of diagnosis, but even with my limited experience I have seen several mistakes committed with regard to these growths, and I can conceive no more easy method of establishing one's reputation at the expense of one's fellow-brethren than by removing, practically with a "turn of the wrist," a disease said to have been incurable, and which is undermining the constitution of the patient. Surely even Count Mattei's treatment must dwindle into insignificance at such miraculous results.

I have abstained in the foregoing brief remarks from entering in any way into details upon the extensive subject my paper deals with. I have refrained even from so much as touching on its literature, as my object has been mainly to bring before the Society a record of the somewhat interesting series of cases mentioned, and incidentally, as far as possible, to interest you in some of the clinical features they displayed. To Dr Stiles, Surgical Pathologist, Edinburgh University, I am indebted for the preparation of the excellent microscopic sections of the tumour I show you.

Dr Underhill thought the paper of Dr Haultain a valuable one, from bringing before the Society an interesting series of various forms of polypi. He thought, however, that it rather underestimated the proportion which mucous bear to fibrous polypi. In his own experience he had seen a considerable number of the former kind. There was one point which had not been touched on, namely, that mucous polypi were far more liable to be attended by hæmorrhage when removed than fibrous ones. In fact, a fibrous polypus had next to no bloodvessels in itself; all the blood supply came from the mucous layer which covers them. So far as he knew, the

late Dr Hardie was the first to describe squamous epithelium on the surface of polypi. He showed to the Society many years ago a fibroid polypus in the mucous covering of which were found numerous "prickle cells" similar to those found in the skin.

The President quite agreed with Dr Underhill and Dr Haultain as to the risk of hæmorrhage in cases of cervical mucous polypus. He had seen very profuse hæmorrhage after division with scissors of the neck of a comparatively small polypus from the lip of the cervix, requiring the use of strong styptics and plug. On the other hand, the severance of the neck of a fibrous polypus was usually followed by cessation of hæmorrhage. Bleeding, even to a dangerous degree, might have been going on during the gradual separation of the pedicle, but it ceased when by a twist or two the structures were completely torn through. He had seen many illustrations of this, and showed the Society many years ago a large fibroid tumour where hæmorrhage ceased when the pedicle was twisted through, and where the mass, the size of a child's head, had to be afterwards removed from the virginal vagina by cutting into the mass to diminish its bulk.

Dr Brewis had much pleasure in congratulating Dr Haultain on his paper, which he considered most valuable from a clinical and pathological point of view. Errors in diagnosis are frequently made in the case of tumours of the uterus which occupy the vagina, and to prevent such mistakes a careful bimanual examination to make out the attachment of the tumour, and a microscopical one to find out its nature, are essential.

VIII. STUDIES IN FŒTAL PATHOLOGY AND TERATOLOGY.

VI. On a Case-taking Scheme for Fœtal Diseases and Deformities.

By J. W. Ballantyne, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Diseases of Infancy and Childhood, Minto House, and on Midwifery and Diseases of Women, Medical College for Women, Edinburgh; Physician for Diseases of Women and Practical Obstetrics, Western Dispensary, Edinburgh; and Secretary to the Edinburgh Obstetrical Society.

During the investigation of certain examples of fœtal disease and deformity, I constructed, for my own use, the following scheme, in order that I might be able systematically to record all the important clinical details and pathological characters of each case. It is, in my estimation, very far removed from an ideal scheme; but since I have been unable to find in any work upon fœtal maladies any case-taking method described, I have ventured to bring this one forward in the hope that it may prove of some service to other workers in this field of research.

I shall first give the scheme, and thereafter make some remarks upon its component parts.

Case-taking Scheme for the Investigation of Fœtal Diseases.

I. Clinical History and Symptomatology.
  A. Maternal.
    1. General.
      a. Age, development, weight, and height.
      b. Habits and environment.
      c. Constitution.
      d. Diseases.
      e. Deformities.
    2. Sexual.
      a. Menstruation: type, habit, etc.
      b. Marriage: early or late, etc.
      c. Morbid states of uterus and annexa.
      d. Pregnancies.
        (1.) Past: number, character, etc.
        (2.) Present: character, plural or single, etc.
          Symptoms in Pregnancy—
            a. Maternal: gastric, renal, nervous, etc.
            β. Fœtal: movements, heart-beat, etc.
      e. Labours and puerperia.
        (1.) Past.
        (2.) Present.
      (*f.* Later sexual history.)
  B. Paternal.
    Health, constitution, habits, etc.
  C. Infantile: when the infant is born alive and survives for a longer or shorter time; or when there are twins, one of which lives.
  D. Family clinical history—heredity.

II. Morbid Anatomy.
  A. Of fœtus.
    1. External appearances.
    2. Internal appearances.
    (3. Sectional appearances.)
    4. Microscopic appearances.
    5. Bacteriological investigations.
    6. Chemical characters of fluids, etc.
  B. Of fœtal annexa.
    1. Placenta.
    2. Umbilical cord.
    3. Membranes.
      (1.) Chorion.
      (2.) Amnion.
    4. Liquor amnii.
  C. Of mother (if death follow confinement).

It will be seen that the scheme is divided into two parts, the first of which deals with all that relates to the clinical history and symptomatology, whilst the second is concerned with the investigation of the morbid anatomy of the products of conception. With regard to the first of these lines of research, it must be admitted that occasionally perfectly healthy mothers give birth to diseased or deformed fœtuses, and that sometimes normal infants are born to mothers suffering from serious illnesses. In such cases the value of the investigation of the clinical history of the parent may have no very evident value, but the inquiry is not on that account to be abandoned; for so little is yet definitely known with regard to the effect of disease in the parents upon the fœtus, and of fœtal maladies upon the health of the mother, that in each instance a searching examination ought to be made of the medical history of the parents and of the obstetrical record of the mother. It is probable that if this examination were carefully made, facts of the greatest interest would in nearly every case be forthcoming.

With regard to the second line of inquiry, whilst it is not sometimes possible to make a dissection of the fœtus (for the diseased or deformed infant is happily not invariably still-born or dead-born), it is always open to us to investigate the naked-eye and microscopic characters of the placenta, membranes, and cord. When, however, the child is born dead, or dies soon afterwards, the systematic examination of its tissues and organs ought not to be omitted. Further, when the mother unfortunately also succumbs to the effects of the labour, or to other causes, a post-mortem examination of her body is a means of investigation which may throw great light upon the genesis of the fœtal malady.

Some of the lines of inquiry mentioned in the case-taking scheme may now be considered *seriatim*.

The investigation of the clinical history of the mother ought, in the first place, to deal with certain purely medical questions. The bearing of these questions upon fœtal morbid processes may not be very evident, but it is of importance that in such an intricate subject all the available information should be secured. Reference is now made to the medical conditions of the mother existing prior to and apart from her sexual and obstetrical history. These conditions, if they have been active at all, may have influenced the unimpregnated ova in the ovary, and through them when fecundated the fœtuses developed from them; or they may have so altered the general economy of the maternal organism as to make it impossible for a healthy embryo to be produced and brought normally to maturity. It must at the same time be admitted that it is nearly impossible to state whether in a given case the morbid tendency pre-existed in the ovum before impregnation, or was impressed upon it at the time of conception or during pregnancy.

Among the questions to be inquired into are the mother's age,

height, weight, and general development, for it is probable that the ova of very young or of very old mothers may be inherently less strong and healthy than those of women in their prime, and that the inferior or superior state of development of the maternal organism may influence the size, weight, and health of the fœtuses which she produces. Hecker, Duncan, and Irme have shown, at any rate, that the weight of the infant at birth increases up to a certain point with the increase in age of the mother, and that there are certain years in her life when the likelihood of a heavy child's being born is very great. The height, weight, etc., of the mother ought to be carefully noted in cases where dwarf or giant children are produced.

It is very probable that the condition in life and the habits of the mother profoundly influence the health and development of the ovum and fœtus. It has, at any rate, been stated that fœtal diseases are rarely observed in the case of healthy, robust women living in comfort, whilst they are more frequent in mothers supplied with insufficient or poor nourishment, exhausted by excessive fatigue, or crushed with sorrow, misery, or anxiety; and it is admitted that the malign influence upon the fœtus of the alcoholic and of other vicious habits of the mother is undoubted, although its *modus operandi* may not be understood.

The constitution and temperament of the mother may also affect the condition of the fœtus. A highly-strung nervous system or a hysterical temperament I have sometimes noted in conjunction with the production of fœtal deformities.

The maternal medical history of the diseases of infancy, childhood, and adult life ought to be inquired into. The occurrence of rickets, convulsions, fevers, etc., in early life, and the presence of syphilis, anæmia, hepatic and renal disease, diabetes, lead-poisoning, etc., in later life are factors whose influence upon the fœtus in a direct way, or through its annexa indirectly, must be taken into account.

Maternal deformities also ought to be noted, for such are sometimes directly transmitted, as in certain cases of supernumerary digits, harelip, etc. That acquired deformities may be hereditary is very doubtful—their transmission is denied by Weissmann and others—but their presence should be noted in order that statistics may be obtained.

The investigation of the sexual and obstetrical history of the mother often yields more directly valuable indications with regard to the causes of ante-natal disease than does that of the purely medical record. There is a connexion between the whole of the mother's organism and that of the unborn infant, but there is a much closer relationship between the uterus and the blood circulating in it and its contained fœtus. The following matters should, therefore, be most carefully inquired into.

The mother's menstrual habit and type ought to be ascertained,

and any abnormal conditions, such as excessive or diminished flow, pain, etc., noted, for from such information something may be learnt of the state of the genital organs and their fitness for the discharge of the reproductive functions.

It is difficult to obtain satisfactory statistics bearing upon the question whether the married or single condition of the mother influences the health of the fœtus; but when it is borne in mind that a woman pregnant of an illegitimate child must of necessity be placed under less advantageous circumstances than her happier married sister, it seems likely that the fœtus in utero may suffer therefrom. The question of the effect of consanguinity is a moot point; but it is not to be neglected on that account. The age at which the married state was entered into is also worthy of note.

Grave diseases and anomalies of the uterus, ovaries, and tubes usually render the patient sterile, and this means either that these organs are unable to perform the functions necessary for the occurrence of conception and for the progress of fœtal development, or that the ova in such cases are destroyed or rendered incapable of healthy fecundation. In less serious maladies affecting the maternal genital organs, conception and some degree of development may take place, but from inherent morbidity in the ovum, or from pathological conditions of the uterus and annexa, gestation is brought to an untimely end in miscarriage or premature labour. It may be conceded that a diseased uterine mucosa cannot grow a healthy placenta, and in this way a morbid state of the uterine contents may be brought about. Maladies of the mother's pelvic viscera ought then to be investigated.

If the mother be a multipara, the history of the details of her previous pregnancies must be gone into. Such matters as the number of gestations, the rapidity with which they followed each other, the occurrence of abortion or premature labour, and the history of abnormal symptoms during their course, should be investigated. For fœtal diseases are apt to repeat themselves in successive pregnancies, and the history of the past may often serve to elucidate the present condition. In a recent paper on General Fœtal Dropsy I pointed out how a woman gave birth to three dropsical infants in succession, and the same thing has been noted in other ante-natal diseases and anomalies. The occurrence of plural conception is of peculiar interest, and should always be inquired into.

The pregnancy whose product is the diseased or malformed fœtus must be especially carefully investigated. Every detail in which it differed from the normal should be noted. First, the condition of the mother during the gestation is of vital importance. She may have suffered from an infectious fever, and this may explain the conditions found in the infant at birth, or may supply the cause of abortion. The residence of the parent in a locality where, for example, smallpox is prevalent, may be sufficient to

cause that disease in the fœtus, the mother herself enjoying the immunity which has been conferred upon her by vaccination or by a previous attack. Any other affection that may have occurred during pregnancy, such as renal, hepatic, gastric, pulmonary, or mental disorder, should be inquired into, as it may serve to throw light upon the abnormal intra-uterine conditions. The connexion between albuminuria and placental disease is a case in point. The history of maternal impressions also ought to be critically scrutinized. Again, the occurrence of traumatism during pregnancy may serve to explain some cases of fœtal disease and death, and the administration of certain drugs to the mother in the course of her gestation may be the exciting cause of tissue-changes in the fœtus. Second, the physician should note the history which he may obtain of any deviations from the normal in the symptomatology of the pregnancy. The character of the fœtal movements, the rate of the fœtal heart, and the evidence of a large or small quantity of liquor amnii, are points which should be inquired into. Sometimes a distinct history of the signs of fœtal death may be forthcoming,—such as cessation of fœtal movements, stoppage of heart-beats, feeling of weight and coldness in the lower part of the abdomen, retrogressive changes in uterus and mammary glands, and peculiar sensations experienced by the mother. At other times weakness of the fœtal movements has been present, and it has been found that a weakly infant or one with partial or entire absence of the limbs has been born. Sometimes the movements of the infant in utero have been violent and tumultuous, and fœtal shiverings from malaria or convulsions from brain disease have from this sign been diagnosed. Irregularity in the rate of growth of the uterine tumour has occasionally been noted, and has led to the diagnosis of hydatid degeneration of the chorion, hydramnios, etc. It is only by the careful recording of such circumstances that we can ever hope to build up a system of fœtal symptomatology.

From the history of past confinements information may often be gathered which is of value in connexion with the understanding of fœtal disease. The records of tedious, instrumental, or complex labours, of the birth of still-born or dead infants, and of abnormal phenomena in the third stage, ought to be carefully scrutinized. It is sometimes found that fœtal morbid states have a tendency to be reproduced in successive pregnancies, and from a history of past confinements one is often able to trace such a repetition of diseased manifestations, varying frequently in intensity. This is especially true of syphilis. So marked is this tendency, that it has been customary to speak of habitual abortion, habitual premature labour, and habitual fœtal death, although it is doubtful whether the idea of *habit* suggested by the name is a correct one.

Of course, all the clinical details of the confinement which terminates in the birth of a morbid fœtus are of immense import-

ance. The infant may be alive and healthy before labour sets in and may yet die, or suffer injuries leading to disease during the process of birth.

Again, certain pre-existing fœtal maladies, such as ascites, congenital tumour growths, hydrocephalus, some monstrosities, and the like, may seriously interfere with the process of parturition,—so much so as sometimes to necessitate operative interference, entailing the death of the infant.

The history of the confinement, therefore, is important, and so also is that of the puerperium; for it may be found that certain abnormal conditions—*e.g.*, albuminuria, dropsy, etc.—found during the pregnancy rapidly disappear after the birth of the child, and were perhaps due to the fœtal disease or the distension of the uterus during gestation.

The history of the pregnancies and confinements which follow the birth of a deformed or diseased infant is a matter with regard to which little information is forthcoming in the great majority of recorded cases. The after-history of all such cases ought, however, to be followed up, and is of great interest when narrated. When a woman gives birth to an abnormal fœtus, means ought to be taken to prevent the recurrence of such an event, and the success or failure of such means will be manifested sometimes by the history of the succeeding gestations. In this way it is possible to look for an augmentation in number of the therapeutic measures which are of value in intra-uterine disease.

In the great majority of the recorded cases of fœtal disease nothing is stated with regard to the health of the father. This is unfortunate, for it seems to be certain that paternal morbid states, acting through the spermatozoon, are potent in inducing disease and deformity in the fœtus. I have myself seen some cases in which I believed that I was able to trace to the father the origin of the ante-natal malady of the infant. The age of the father, his degree of development, his habits, especially the alcoholic, and certain diseases, such as syphilis, nephritis, diabetes, cancer, tuberculosis, lead poisoning, mental disorder, etc., from which he may suffer, ought to be noted in all cases of intra-uterine disease. It is impossible yet to foretell how far such inquiries may yield valuable results.

It is almost unnecessary to say, that when the morbid infant survives its birth all the details of its symptoms and a record of its appearances should be noted. Certain malformations only lead to injurious and evident results after birth. The imperforate condition of the anus, absence of the common bile-duct, congenital heart disease, the existence of hare-lip and cleft-palate, etc., are cases in point. Further, should twins be born, one healthy, the other diseased, deformed, or dead, the clinical history of the survivor may be of some interest.

Certain malformations and some fœtal and congenital diseases are well known to be hereditary, and it will be well in all cases to inquire into the medical history of grandparents, uncles and aunts, etc.; for an inherent morbid tendency may not manifest itself in each generation, or, indeed, in each individual of the generation. The study of the phenomenon known as atavism has already thrown light upon certain congenital anomalies, and results of great value are to be looked for in this direction. In the case of some diseases—*e.g.*, hæmophilia—it would seem as if the morbid tendency remained latent in the female until the supervention of pregnancy, and that then it appeared, but only in her fœtus if a male, and not in the other parts of the mother's organism. "It would be an advantage," says Cooke Hirst, "to begin the observation of the fœtus as well as its treatment a hundred years before its procreation, in a study of antecedent generations" (*American System of Diseases of Children*, vol. i. p. 235, 1889).

In connexion with the investigation of the clinical history of the parents in cases of fœtal disease, it must not be concluded that because the malady of the mother is not of the same type as that of the fœtus they are independent of each other. It would seem that one disease in the mother may give rise to another in her offspring. It has, for example, been held by Sänger that maternal nephritis may cause leukæmia in the fœtus.

I need say nothing with regard to the second part of the case-taking scheme—that dealing with the morbid anatomy of the fœtus and its annexa—for that has already been treated of pretty fully in a previous communication ("The Investigation of Fœtal Disease," *Edin. Med. Journal*, March 1892).

The President said that Dr Ballantyne had rendered a real service to the science of this department in drawing up the case-taking scheme. It would prove a most useful guide in recording the conditions associated with individual cases, and so would aid very distinctly in advancing our knowledge of teratology. The scheme seemed to take note of all the important points, and was not unnecessarily elaborate.

Dr Underhill remarked that Dr Ballantyne's paper was, so far as he knew, the first serious and definite effort which had been made to reduce to a system the complicated conditions found in teratology. At present the matter was in a state of chaos. He hoped Dr Ballantyne's schedule would be printed and circulated, so that all might work on a common method, and eventually some important illumination might be thrown on these mysterious questions. Dr Ballantyne had stated truly, that acquired peculiarities in the mother were rarely, if ever, transmitted to the fœtus. He, however, had seen one such case. A woman who had had hare-lip, which had been operated on in childhood, gave birth to a baby in which *the cicatrix and not the hare-lip* was reproduced.

Here was a plain case of reproduction in the offspring of an acquired condition.

Dr Cullen could not suggest any improvement on the admirable scheme which Dr Ballantyne had drawn up. He was glad that there was a special heading for recurrent fœtal disease, as this was a point which was often not sufficiently dwelt upon. He had recently met with a remarkable case of recurrence of the same disease in succeeding fœtuses. Mrs M., æt. 35; married eleven years; nine labours, last being in March 1892. Her first two labours were normal, and the two children are alive and healthy. The following five pregnancies ended in the birth of children afflicted with malignant jaundice, and they survived for various periods ranging from a minimum of a few hours to a maximum of nine days. Her eighth pregnancy terminated at the seventh month with the birth of a child which had been already some weeks dead. The ninth pregnancy went to the full time, and though the infant was deeply jaundiced this condition passed off in a few days without any bad symptom, and the child has so far thrived fairly.

IX. A SERIES OF ABDOMINAL SECTIONS.

By N. T. Brewis, M.B., F.R.C.P.E., Lecturer on Gynæcology, Edinburgh Medical School; Gynæcologist, New Town Dispensary; Secretary, Edinburgh Obstetrical Society; formerly Assistant to late Physician for Diseases of Women, Edinburgh Royal Infirmary.

In this series I propose to record the last thirty abdominal sections that I have performed. The list includes, with one exception, every case in which I have opened the abdomen during the last two years. The case which I leave out was a patient of Dr Allan's of Falkirk, and was recommended to me by Dr Joseph Bell. She had an ovarian tumour, which burst some months before I saw her; and when the abdomen was opened, the intestines, mesentery, and omentum were found studded over with innumerable hard nodules of a malignant nature, ranging in size from a pea to a child's head, and immovably fixing the large and small bowel. Removal of the affected parts was out of the question, and after evacuating the fluid, which was colloid and ropy, the wound was closed. The patient died about a fortnight afterwards of intestinal obstruction. As the operation in this case was little more than a tapping, I think I am entitled to exclude it from the present series.

I give my last thirty cases because they illustrate my more recent work, and because they show an improvement on those which preceded them. In the series there was no selection of cases made. Where operative interference was necessary, I excluded none, however difficult, and left none unfinished. There have been no deaths from ovariotomy or removal of diseased

appendages, and there were twenty-five consecutive cases of abdominal section for various conditions without a death.

This improvement I attribute in the most part to increased experience, and in a great extent to altered technique. My recent operations have not been less difficult than my earlier ones. A number of them have been of the most serious kind, but experience has taught me to tackle them more successfully. In my earlier cases I used antiseptics in the abdominal cavity, I didn't irrigate, and I seldom drained. In the later cases I have used no antiseptic in the abdomen, and have irrigated and drained frequently. I was led to give up antiseptics in the peritoneal cavity from having had a case in which the patient suffered from distinct carbolic acid poisoning, and with the abandonment of antiseptics irrigation naturally took its place. The non-use of antiseptics internally has resulted in marked improvement in the recovery of the cases. Its use was frequently followed by considerable constitutional disturbance. High temperatures, which made me anxious, were common. Severe headache and stupor lasting for days were often complained of, and were erroneously attributed to the anæsthetic employed. Since plain hot water was substituted for carbolic acid, the recoveries have been uneventful in nearly every case. There has been a complete absence of constitutional disturbance and of nervous symptoms. The temperature in the last thirty cases has seldom reached 100°. Although I have given up antiseptics internally, I may state that all preparatory measures are carried out with full antiseptic precautions. I irrigate the peritoneal cavity with hot water whenever there has been the least soiling of the peritoneum, and when many adhesions have been separated. When pus or much blood has touched the peritoneum flushing is undoubtedly called for; but it is also necessary in every case where the fluid of a cyst has come in contact with the peritoneum, because we do not know when it contains malignant elements and when it does not. I have seen malignant thickening of the wound cicatrix and of the peritoneum occur a year after an apparently simple ovarian cyst had been removed, and have no doubt that the fluid infected the surface from having been brought in contact with it during the operation. This result might have been averted by flushing. Irrigation cleanses the surface, clears away all clots and particles, and thus relieves the peritoneum of resorption, and thereby prevents constitutional disturbance.

Drainage like flushing relieves the peritoneum of the work of resorption, and by so doing prevents septic peritonitis and muscular paralysis of the bowel. The peritoneum is a very absorbent structure, but we never know the extent of its absorptive power. Doubtless in strong healthy women the power is great; but in the weak and elderly it is not so, and in them it is well not to trust to the peritoneum. As fluids in the peritoneal cavity sometimes

become septic, their removal by the drainage-tube is desirable. I believe that the drainage-tube, instead of being a means of introducing sepsis into the peritoneal cavity, is a most valuable preventive of it. That blood in considerable quantity left in the peritoneum does not always decompose, I know from the fact that in more than one of my more severe cases, in which there were numerous adhesions, a hæmatocele formed behind the uterus, and after two or three weeks became absorbed. It is also to be remembered that fluids in the abdomen may act as irritants to the intestine, and produce paralysis of it, with symptoms of obstruction. I use the drainage-tube in every case in which the sponges do not come up dry. It enables us to finish the operation quickly, to watch the after-progress of the case, and to adopt prompt measures when there is anything wrong. I now propose to make a few remarks on some clinical experiences which the following cases bring to my mind.

Diseased Appendages.—Sixteen of the cases were examples of the above, and all recovered; these operations were undertaken to remove pain, and in some instances hæmorrhage as well. I consider abdominal section justifiable, and recommend it—

First, When the patient has been sterile for some time, and when pain sufficiently severe to prevent her from enjoying life or attending to her household duties has existed for a considerable period, and when after palliative treatment of some months' duration the symptoms are not relieved, and the appendages remain tender on palpation.

In these cases one is perfectly justified in opening the abdomen to find out the exact condition of the appendages, and to remove the parts, break down adhesions, resect ovaries or tubes, or do whatever one thinks will relieve the sufferer. In case No. 15 the ovaries were found healthy to all appearance, but surrounded by old peritonitic adhesions. The adhesions were carefully separated and the ovaries put back into the abdomen.

I always insist on a thorough trial of palliative treatment, as it is frequently successful. Some patients, however, are impatient of it, and more than one has left me to go elsewhere in the hope of being operated on at once. The chief palliative measures adopted are rest in bed, free purgation, occasional blisters, and the use of vaginal tampons soaked in glycerine and boro-glyceride. I have found the latter of great use in inflammatory cases. In addition to their sedative and absorptive action they appear to me to lessen pain by acting as a splint, whereby they limit the movements of the parts.

Secondly, I have no hesitation in at once recommending removal of the appendages when they are found distinctly enlarged, and when pain is present as a more or less constant symptom. Cases of hydrops folliculi, hydro-, hæmato-, and pyo-salpinx furnish examples of this class.

A Series of Abdominal Sections. By Dr Brewis.

No.	Name.	Age.	Medical Attendants.	Date of Operation.	Disease.	Remarks.	Result.
		Years.					
1	Mrs J.	20	Dr Brewis.	Jan. '90.	Diseased appendages.	Enlarged cystic ovaries. Infantile uterus. Intractable pain.	Recovered.
2	Mrs B.	27	Do.	Jan. '90.	Do. (Gonorrhœal).	Inflammation of appendages. Strong adhesions. Scanty menstruation. Drained.	Do.
3	Mrs R.	32	Dr Darling.	Mar. '90.	Do.	Retroflexion with prolapsed enlarged fixed ovaries. Drained.	Do.
4	Mrs H.	32	Dr Brewis.	Jan. '90.	Do.	No adhesions. Good recovery.	Do.
5	Mrs B.	29	Do.	Sept. '90.	Do. (Gonorrhœal).	Inflammation of appendages. Strong adhesions. Drained. (Scanty menstruation.)	Do.
6	Mrs M'K.	28	Do.	Nov. '90.	Do.	Appendages adherent to pelvic floor. Difficult operation. Irrigated. Drained.	Do.
7	Mrs B.	21	Do.	Nov. '90.	Do.	Infantile uterus. Small ovaries and tubes. Constant pain.	Do.
8	Mrs C.	25	Dr W. Lundie.	Jan. '91.	Do.	Adherent enlarged cystic ovaries.	Do.
9	Mrs W.	26	Dr Brewis.	Jan. '91.	Do.	Salpingitis. Cystic ovaries. No adhesions.	Do.
10	Mrs M.	30	Do.	Feb. '91.	Do. (Hæmatosalpinx).	Menorrhagia. Severe pain. Adhesions.	Do.
11	Mrs W.	27	Do.	June '91.	Do. (Gonorrhœal pyosalpinx).	Scanty menstruation. Constant pain.	Do.
12	Mrs D.	37	Dr MacKay, Falkland.	June '91.	Do. (Pyosalpinx).	Menorrhagia. Constant pain. No history of gonorrhœa.	Do.
13	Mrs C.	35	Dr Smith.	Sept. '91.	Do.	Hemorrhage. Pain. Salpingo-ovaritis. Adhesions.	Do.
14	Mrs T.	29	Dr Duff, Wishaw.	Oct. '91.	Do.	Prolapse and enlargement of ovaries. Constant pain. No adhesion.	Do.
15	Mrs C.	27	Dr Brewis.	Jan. '92.	Do.	Ovaries adherent. Adhesions separated. Ovaries not removed.	Do.
16	Mrs W.	39	From Kirriemuir.	Feb. '92.	Do.	Prolapsed, enlarged, adherent ovaries. Drained.	Do.
17	Mrs W.	26	Dr A. Moir.	Dec. 28, 1889.	Ovarian tumours.	Long twisted pedicle. Tumour adherent to omentum and bowel. Drained.	Do.
18	Mrs S.	29	Dr Booth.	May '90.	Do.	Entirely adherent. Wedged in pelvis. Irrigated and drained. Hæmatocele after.	Do.
19	Mrs C.	25	Dr Rosa.	May '91.	Do.	Large tumour. Urine scanty, albuminous, granular casts.	Do.
20	Mrs C.	58	Dr Allan Gray.	Mar. '90.	Do. (Dermoid).	No adhesions. Easy recovery.	Do.
21	Mrs W.	29	Dr Brown, Lester.	Nov. '90.	Do. (Dermoid suppurating).	Adhesions. Suppurating dermoid of left ovary. Irrigated; drained.	Do.
22	Mrs A.	32	Dr Wright, Kelso.	May '91.	Do. (Dermoid).	Dermoid of right ovary. Adhesions. Irrigated; drained.	Do.
23	Mrs D.	27	Dr Brewis.	Apl. '90.	Parovarian cystoma.	Cyst on point of rupturing when abdomen was opened. Adhesions. Irrigated and drained.	Do.
24	Mrs M'K.	33	Dr Dewar.	Feb. '91.	Fibroid. (Uterine).	Hysterectomy.	Do.
25	Mrs I.	44	Dr Brewis.	Sept. '91.	Do. do.	Hysterectomy. Portion in pelvis irremovable.	Death from obstruction.
26	Mrs L.	44	Dr Mill.	Sept. '91.	Do. do.	Subperitoneal fibroid. Appendages removed for pain.	Recovered.
27	Mrs M'T.	45	Dr Brewis.	Feb. '90.	Fibro-cystic tumour of uterus.	Case reported in *Obstetric Trans.*, 1890. Drained.	Do.
28	Mrs D.	24	Dr Rosa.	May '91.	Contracted pelvis. (Pregnancy).	Porro-Cæsarean section, reported *Ed. Obst. Trans.*, 1890-91.	Do.
29	Mrs R.	33	Dr Stewart.	Feb. '92.	Extra-uterine gestation.	Sac in peritoneal cavity, entirely adherent. Drained.	Died.
30	Mrs D.	37	Dr Brewis.	Jan. '92.	Ventral hernia.		Recovered.

Thirdly, When much pain is complained of, and there is an undoubted history of gonorrhœa, removal of the appendages is the only treatment which will cure the patient.

Fourthly, Cases of severe hæmorrhage not due to uterine disease, and which resist ordinary remedies, can only be successfully treated by removal of the appendages, because they are diseased and are the cause of the bleeding. Pain is present, and may in itself be sufficient to justify operative measures, but I refer more particularly to those cases in which hæmorrhage is the leading symptom, and the one which demands attention.

A patient whom I saw with Dr Smith of Bonnington furnishes an example of the kind of case I mean. The lady was 35 years of age, had been married ten years, had had two children, the youngest of whom was 6 years old. She had had no miscarriages. The patient had suffered from profuse menorrhagia for four years, the period usually lasted ten days, and the amount was so great that Dr Smith had frequently to plug the vagina.

A year before I saw her the uterus was curetted, but with no good result. The ovaries were found enlarged, prolapsed, and fixed by strong peritonitic adhesions; they along with greatly thickened tubes were removed; there has been no bleeding since, and I have little doubt that she will soon regain her former strength.

I have given you, Mr President, the rules which guide me in recommending this operation. I will now briefly mention the after-results. The points usually inquired about are—1st, sexual desire; 2nd, menstruation; 3rd, relief of symptoms—chiefly pain.

With respect to the first of these I can give no information, as I have made no inquiries. Regarding the second point, my experience is that with removal of the appendages the phenomena of the natural menopause become asserted. Various nervous reflex symptoms are present in nearly every case. Complete cessation of menstruation occurs in a number, while regular periodic discharges take place in some, and irregular hæmorrhages, more or less profuse, are present in others; sooner or later total absence of discharge comes to all. At one time I thought that if you left behind a small piece of ovary the patient would continue to menstruate. This notion I have found to be erroneous, because in a number of cases, when operating for pain I was not careful to remove the whole ovary, I have noticed that there was no return of menstruation, while in cases where the entire ovaries were taken away there have been those irregular hæmorrhages of which I spoke.

In reference to the third condition, viz., the relief of symptoms, I am able to give a very satisfactory answer. If I exclude the neurotic patients, then I can say that in every case the result has been successful. Every patient that I have been able to question tells me that her old pain is gone, and that she feels a new woman.

With my patients of a neurotic temperament it is different—they say the old pain remains. It probably will till the end of their days. I have learnt that the ovaries of neurotic patients are best left alone. I have had three cases of this class, and, as far as I know, they are the only ones who do not rejoice that they have undergone the operation. I have operated on three cases of hæmato-salpinx, two of pyo-salpinx, and one of hydro-salpinx. All were bilateral; none were diagnosed beforehand. I have inquired carefully into the histories of the cases of tubal distension to find out any symptom, or group of symptoms, common to them which would aid us in diagnosing those conditions. It would be of the greatest importance if such cases possessed well-marked pathognomonic symptoms, because these diseases are dangerous to life, and if we were sure of our diagnosis we would be justified in urging operative measures. I did not find their symptoms to differ from those of other affections of the appendages,—pain was common to all, but possessed no special diagnostic characteristic. Three of the cases originated in puerperal inflammation. One case of pyo-salpinx was of gonorrhœal origin, while the other had no specific history; menorrhagia was present in five cases; in one (pyo-salpinx) the type of menstruation had not been altered, the discharge being scanty. Three of the present series had a distinct gonorrhœal history. In fact I attended them in the first instance for acute gonorrhœa. In two of them the appendages were agglutinated by strong peritoneal adhesions; in one the tubes were filled with pus. In all of them there was scanty menstruation and constant pain. My experience of gonorrhœa in the female is, that while in a few cases the inflammation reaches the appendages and produces serious changes, in the majority no such results follow, the inflammation does not extend beyond the vagina.

Ovarian Tumours.—Of the six recorded in this list it is noteworthy that three were dermoids. The first case (No. 17) was an extremely interesting one. The patient was a thin, frail woman, and had been delivered of a seven months' child three months before I saw her. After her child was born she noticed that her abdomen remained large. The swelling presented all the characters of an ovarian cyst, excepting that over its upper surface a distinct bruit was heard, and over the lower two-thirds of its anterior surface a tense band was felt. When the abdomen was opened the lower anterior part of the cyst was found free of adhesions, and the tense band was made out to be the pedicle of the tumour, which was about an inch in diameter, and was twisted two and a half times from left to right. The whole of the upper anterior surface of the cyst was covered with thickened adherent omentum, while on the top and over the entire posterior surface extremely vascular adhesions bound it to small intestine. The adherent omentum was removed, but the bowels were left attached

to the tumour, as on attempting to separate them the hæmorrhage was so copious that it was felt the patient could not stand the loss. The anterior surface of the cyst was removed, and its cut edges stitched into the abdominal wound. The points of interest in the case are the torsion, length, position, and tension of the pedicle. The tumour must have been in existence during pregnancy, and, being movable, rotation may have been caused by uterine contractions or fœtal movements. The length of the pedicle may be accounted for by the lax condition of the pelvic ligaments. The position and tension of the pedicle were probably due to the adhesions fixing the upper and posterior part of the tumour. The vascular bruit proceeded, in all likelihood, from the vessels of the omentum stretched over the tumour. The patient recovered well, and has now a small fistula.

I have seen one case, in Dr Angus Macdonald's practice, where the tumour was entirely detached from its pedicle, and was nourished by adhesions. In such cases I am inclined to think that the separation is not caused by twisting, but by tension of the pedicle, because the adhesions must be antecedent to the snapping of the pedicle, and of course would prevent twisting of it. Case No. 18 was entirely adherent, and the lower part of it was wedged in the pelvis, and is interesting on account of the hæmatocele which formed after operation.

Fibroid Tumours of the Uterus.—In both of the hysterectomies recorded here, and also in the case of myomectomy, the pedicle was secured extra-peritoneally by Tait's modification of Kœberle's wire constrictor. This instrument, in my opinion, leaves nothing to be desired as a pedicle clamp. In the case which ended fatally, death resulted from intestinal obstruction, caused by a portion of the tumour which was fixed in the pelvis and was irremovable.

The case of myomectomy, which proved the most difficult operation that I have been called on to perform, has already been brought before the notice of the Society. The Porro-Cæsarean section has also been recorded in the Society's *Transactions*. I do not intend to discuss the case of extra-uterine gestation to-night, as I hope to report it fully on a future occasion, after I have completed a microscopical examination of the sac. The operation was performed in the thirteenth week of pregnancy. The sac was in the abdominal cavity, and had to be dug out from among the bowels and omentum in which it was embedded. The sac ruptured during the manipulations, there was copious hæmorrhage, and the patient died suddenly from shock a few hours after the operation.

I have never tapped an ovarian or parovarian tumour for diagnostic purposes. Tapping is a very dangerous proceeding, because we never know beforehand the nature of the tumour contents. A patient of mine had ascites, and when she died the peritoneum was found invaded by malignant growths. A year

before I saw her she had an ovarian tumour, which had been first tapped and shortly afterwards removed. Probably the peritoneum became infected at the tapping. As we cannot diagnose with certainty a parovarian from an ovarian tumour, tapping should never be practised when we think it is the former. Even if our surmise turns out correct, the fluid of a parovarian tumour is not always innocent. Several cases of burst ovarian cyst have come before my notice, and all have had thick, jelly-like contents. In them the walls are thin, and as the contents are semi-solid, rupture easily takes place. The contents of these tumours are apparently of a malignant nature. The case mentioned at the beginning of this paper shows that; and in one case of Dr Macdonald's, in which he removed the ovarian tumour and also the opposite ovary, a large cystic tumour formed about a year afterwards. The parovarian tumour recorded in this series was found on the point of rupturing. The cyst wall proper was rent, but the peritoneal covering was intact, and held the fluid. On more than one occasion I have felt cysts of considerable size collapse during an examination without giving rise to symptoms. These must have been thin-walled parovarian or broad ligament cysts with watery contents.

The above operations were all performed in the Cambridge Street Home for Women, and I am greatly indebted to Drs Aitken Clark and Alex. Macdonald for the valuable assistance they have given me.

Dr J. W. Ballantyne congratulated Dr Brewis on his successful series of cases, and thought that the cases which had terminated fatally would have done so in any one's hands. He had that evening shown the fœtus from the ruptured extra-uterine pregnancy, and he hoped that Dr Brewis would at an early date give the Society a special contribution upon that case, which seemed to be of quite peculiar interest.

MEETING VIII.—JULY 13, 1892.

Dr M. T. RATTRAY *in the Chair.*

I. *Dr Haultain* showed a UTERUS removed by the Porro-Müller method of Cæsarean section. The patient from whom the specimen was obtained was a deformed dwarf with a pelvis contracted chiefly in the transverse diameters (details of which will be subsequently published). The operation was performed in a small cottage in the country, along with Dr R. Stirling, Perth, and the result fully justified its selection, as both mother and child were saved. It was of value in endorsing

Dr Lawson Tait's assertion, that elaborate preparations and surroundings were unnecessary for its safe performance, and hence he thought the operation should be decided upon in many cases before undue delay had already so weakened the patient as seriously to impair the chances of her ultimate recovery.

II. *Dr J. W. Ballantyne* showed—(*a.*) PHOTOGRAPHS and a DRAWING of frozen sections of the EXOMPHALIC AND ANENCEPHALIC FŒTUS which Dr Underhill had exhibited at the last meeting of the Society. He had to thank Dr Underhill for permission to examine the specimen, and Dr Chas. E. Gray for the clinical notes of the case. The fœtus was born in the Maternity Hospital on May 10th. The membranes had been ruptured by mistake at 5 P.M. on May 9th, and a great quantity of liquor amnii had escaped; the patient was admitted to the Maternity at 6 P.M. on the same day. There were then no pains present, and the left hand and an elbow of the child were found presenting. At 11 A.M. on May 10th, no pains having occurred, Dr Underhill performed version and brought down a leg. Some pains came on, and at 12.30 the child was delivered with the help of some traction on the leg. The umbilical cord had been ruptured previous to delivery. The pregnancy had advanced as far as the seventh month, for the last menstrual flow had been in October 1891. During the pregnancy the abdominal distension had been unusually great, and the patient had suffered considerably from pain in the left side. No fœtal movements had been felt, and the woman had no idea that she was pregnant. It had been thought that she had an ovarian cyst. The patient did well till the morning of the third day of the puerperium, when the temperature rose suddenly to 103°·8 F. The uterus was washed out, and although nothing was brought away save fine granular debris, an appreciable difference in the temperature was produced. Quinine and antipyrin were also given, and on the evening of the fourth day the temperature was normal. An uninterrupted recovery was thereafter made. The patient, 41 years old, had had five previous pregnancies. None of these had terminated in abortions; all had gone to the full term. The first child was delivered instrumentally. The four first children were born alive and are still living (youngest is now seven years old), but the fifth infant was born dead. The mother could give no information as to the condition of this last-named child, nor the date of its delivery. The general health of the woman had always been good, but since her first pregnancy she had not felt so strong as before, and about a year ago she had an attack of muscular rheumatism. Her menstrual flow had been regular, lasting for four days. The father was a well-made, healthy-looking man. A vertical mesial section showed the peculiarities of the anatomy of this fœtus very well. The head was typically anencephalic. The bones of the basis

cranii were directed downwards as well as backwards; there was no cartilage between pre- and post-sphenoid, although a plate of it was found between sphenoid and basi-occiput; and on the upper and posterior surface of the basis cranii lay a sac containing blood-clot and fibres, and continuous with the extensive spina bifida. The skin in the neighbourhood of the ears and along the margins of the furrow caused by the spina bifida bore numerous long black hairs. There was great extension of the head, the face looking directly upwards. The buccal cavity was directed backwards and markedly downwards, and opened into a large quadrilateral pharyngeal space. Where the neck groove ought to have existed was an enormous deposit of fat lying in front of the sternum and larynx. There was no ossification of the sternum. The anterior part of the chest was very narrow from side to side, and contained only the heart and thymus. The lungs lay quite posteriorly. The spinal column, which consisted of only thirty vertebral bodies, was markedly deformed. Besides the spina bifida it showed a great degree of cervical lordosis, an equally marked cyphosis in the upper dorsal region, and a lordosis of the lower dorsal and lumbar regions. At the sharp angles formed by the curves, one or more vertebral bodies were small and wedge-shaped; these were the 5th, 8th, 12th, and 13th bodies. The total length of the fœtus was 31 cms., that of the head and trunk 18 cms., and that of the spine following the curves was 15 cms. There was also a large exomphalic protrusion, in which lay the whole of the liver and some of the intestinal coils, along with a portion of the stomach. The hernial sac measured 16 cms. in circumference, and its neck had a measurement of 13 cms. The left kidney lay close to the middle line in front of the 16th, 17th, 18th, 19th, and 20th vertebræ, whilst its supra-renal capsule lay in front of it at the level of the 17th and 18th vertebræ. The right kidney, on the other hand, lay close up under the right half of the diaphragm at the level of the same vertebræ as the left, and on the corresponding lung the liver impression was replaced by a renal one. The spleen was displaced downwards and forwards, and lay opposite to the 19th, 20th, and 21st vertebræ. The uterus, bladder, and rectum were normal in position.

(*b.*) A KNOTTED UMBILICAL CORD. The knot was a simple one, and was situated at a distance of 20 cms. from the umbilicus of the infant. The cord was 63 cms. (about 25 inches) in length, 3 cms. in circumference, and had a slightly eccentric insertion into the placenta. It showed a normal degree of twisting. The placenta had a circumference of 48 cms., a maximum diameter of 19 cms., and a minimum of 12 cms. The knot was not drawn tight, and the child (a male) was born alive, and did not even require to have respiration stimulated. The umbilical vessels at the knot were quite patent. It thus contrasted markedly with another case which he had seen, in which the knot was a tight

one, and the child had been dead in utero for some time; in that specimen mercury could be forced through the arteries of the cord but not through the vein. In the specimen shown the cord had in addition to the knot a convolution once round the shoulders. The labour was a very tedious one. The mother was an elderly primipara, had a sub-peritoneal fibroid, premature rupture of the membranes, and uterine inertia. Forceps were needed to deliver; there was a small perineal tear which required two stitches, and there was some bleeding in the third stage. The placenta and membranes were fairly normal in appearance. Dr Ballantyne showed a drawing of the knot slightly opened out, and compared it with drawings of other more complicated knots which had been figured by other observers. With regard to the causation of the knot, it was worthy of note that during pregnancy the fœtal movements had been at times very violent. There was no hydramnios.

(*c.*) A specimen of VELAMENTOUS INSERTION OF THE UMBILICAL CORD, which Mr G. B. Thompson, one of the students of the Medical Missionary Society, had kindly handed to him for examination. The clinical history was that the mother, a vii.-para, 34 years of age, had last menstruated on 16th September 1891, had twice had threatenings of abortion, and had been delivered on July 4th, 1892. She had had six previous children, one of whom was dead. The labour in this (her seventh) pregnancy was rapid, the child presented by the vertex, and was born alive, and is still alive and shows no signs of disease. There was no hydramnios. The father has alcoholic habits, was treated two years ago for "sore throat," and had recently an attack of double orchitis which yielded to antisyphilitic treatment. The length of the cord from the umbilicus to the point where the vessels reached the membranes was 44 cms., and to the placental mass it was 49 cms. The vessels of the cord broke up in the membranes into several large branches, some of which passed directly to the placenta, whilst others pursued a circuitous route in the membranes. The tear in the membranes had very nearly torn through one of these trunks. The outer surface of the chorion showed an unusually thick layer of decidual remains—the result in all probability of a decidual endometritis. Possibly the continued vascularity of the decidua outside the area of the serotina had something to do with the production of the velamentous insertion. The cord measured from 5·3 to 4·5 cms. in circumference, and showed very little twisting. The circumference of the placenta measured 48 cms., whilst its maximum diameter was 17 cms., and its minimum 15 cms. There were no hæmorrhages in the placental substance, but there was a small area (8 cms. by 5 cms.) of paler colour and firmer consistence than the rest.

III. *Dr Milne Murray* showed—(*a.*) A HYDROCEPHALIC FŒTUS. The case occurred in the out-practice of the Royal Maternity

Hospital. The patient had had eight normal children. This, her ninth labour, began at term, and after a short first stage the waters broke at 1 P.M. and the breech came down. The resident having been summoned, found the legs born, and without difficulty the arms were brought down. His efforts to deliver the head being futile, I was sent for about two o'clock. The first impression, on placing the hand on the abdomen, was that there was a second fœtus, so large and resistent did the uterus feel. On vaginal examination, however, the lower parts of the head and face could be felt in the cavity, while the enormous vault could be felt much beyond the brim. The cord having long ceased to pulsate, there was no question as to the propriety of perforating. This was done on the left of the occipital eminence, and a great gush of fluid followed. Sixty ounces of a pale straw-coloured liquid were collected, after which the head escaped easily. The fœtus was a perfectly nourished specimen, weighing 9½ lbs.

(*b.*) For *Dr Underhill*—A FŒTUS delivered by turning in a flat pelvis, showing in a very typical manner the characteristic grooving of the parietal by the promontory. The patient was a secundipara, who two years ago had been delivered with great difficulty. She was then advised, in the event of another pregnancy occurring, to come in and have labour induced at the seventh or eighth month. She seems to have mistaken her time, because on inducing labour at what was supposed to be seven and a half months, it was found her child was quite mature. Turning was easily accomplished, but the head stuck, and the child died before delivery could be accomplished.

IV. *Drs Berry Hart* and *Lovell Gulland* gave their DEMONSTRATION ON THE SECTIONAL ANATOMY OF ADVANCED PREGNANCY IN MACACUS RHESUS.

Dr J. W. Ballantyne thought the thanks of the Society were due to Drs Hart and Gulland for their interesting demonstration. The presentation and attitude of the fœtal monkey, the bilobed character of the placenta and its insertion on opposite walls of the uterus, and the form of the uterine interior, were all points worthy of note. It was further interesting to learn from Dr Gulland that the amnion consisted of a single layer of cells, as in the human gravid uterus. He hoped the authors would still further investigate by the sectional method the subject of the pregnant state in the anthropoid apes.

V. NOTES OF A CASE BEARING ON A RELATION BETWEEN MENSTRUATION AND IMPREGNATION.

By R. MILNE MURRAY, M.A., M.B., F.R.C.P., F.R.S.E., Lecturer on Midwifery and Diseases of Women, Edinburgh School of Medicine.

A GLANCE at the literature bearing on the relation between insemination, menstruation, and conception, shows how much

interest centres in this subject. And yet in spite of all that has been written and said on the matter, our views are by no means as definite as they should be. It is no purpose of mine at present to traverse the facts or the literature of this subject; but a case which has recently arisen in my practice presents points of sufficient interest in this connexion to justify me, I think, in laying the details before the Society to-night.

Mrs S——, 36, married 10 years and sterile, came under my care in October 1888. She had for some years suffered from frequent headaches, attacks of nausea and vomiting, loss of appetite, and other symptoms referred to the alimentary system, and had been treated for dyspepsia by many remedies, but without permanent relief. On inquiry I found that her symptoms were always most marked during the week preceding menstruation, and that for a week or ten days after menstruation she was generally fairly comfortable. Menstruation was regular every 28 days, lasting for 4 days. The discharge was rather scanty, and there was considerable pelvic distress during the first two days. The patient was a tall, spare woman, fond of exercise, and leading a fairly active life in spite of her chronic discomfort.

Seeing that her dyspeptic symptoms had refused to yield to the treatment already adopted, and as the local symptoms pointed to a probable pelvic cause, I examined her and found the cervix hard and conical, the external os somewhat contracted, and the uterus retroverted and retroflexed, the fundus being low down in the posterior fornix, and the cervix high up behind the pubis. The whole pelvis was tender, the lateral fornices especially so, but no definite enlargement of tubes or ovaries could be made out. The uterus did not seem to be bound down, but any attempt to dislodge it was checked by the severe pain set up.

I put the patient to bed under the care of a nurse, and ordered a hot vaginal douche twice daily, and packed the vagina every day with glycerine tampons. In about 10 days I was able to pass a sound without undue pain and turn the uterus forward. The hot douches were continued for about 14 days more, and the uterus, which tended always to resume the retroverted position, was replaced twice subsequently by the sound, and on each occasion Ellinger's dilators were passed and the cervical canal slightly stretched.

The menstrual flow began on the 24th day after the treatment was commenced, and was normal in amount and free from pain. She had had no headache since lying up, and her digestive organs were acting normally. As soon as the menstrual process was completed I again replaced the uterus and introduced a well-curved Albert Smith pessary, and allowed her to get about under reasonable restrictions.

She reported herself early in 1889, and said she was in perfect health, and was obviously laying on flesh; her menstruation

had been perfectly normal since November, and the headaches had never returned. She came to see me at intervals during 1889, and had the pessary removed and replaced, and she said she had never been so well since her marriage.

About the end of October 1889 I thought I might venture to remove the pessary altogether, and see whether the uterus would retain its proper position. She remained fairly well for a couple of months, but returned in January 1890 to say that the old symptoms were returning. On vaginal examination I found the uterus again lying backwards and some tenderness on either side. I ordered her to use the hot douche for a little and then introduced the pessary. The symptoms disappeared almost at once, and she came about the middle of March and asked me to remove the pessary, as she was to be away for some weeks and was afraid something might go wrong with it. This I did, and when I saw her again in May the uterus was normal and she in perfect health, but in a few weeks she again complained of the recurrence of the old troubles, and the pessary was reintroduced and worn during June and July. It was removed in August, as she was leaving town.

I did not see her again till the 27th March 1891. She came to see me looking exceedingly well, but saying that she had not menstruated since December. On examination I found the vagina and uterus soft, the uterus enlarged, the fundus at the brim, and with all the characteristics of being about three months pregnant. I told her my opinion of her condition, and she immediately said, "That cannot be, it is impossible." On my asking why, she said, "Because I was unwell after I was last with my husband."

On further inquiry she gave me the following account of herself from the time I saw her in August 1890. She remained in the country till the beginning of September. She returned home quite well in every way, but in about three weeks felt so ill that she was on the point of sending for me when she was summoned to the country to nurse a sick relative. She had not been more than a week in the country when she began to improve, and in spite of work and anxiety got quite well again. She had been convinced in her own mind for more than a year that the return of her old symptoms and the general breakdown in her health were the result of the resumption of marital relations on her return home. On all the occasions on which she had been in the country during the last year she had been there alone, and she accordingly attributed the recurrence of her symptoms to her return to her husband.

Accordingly, about the beginning of December, she wrote to her husband from the country expressing this opinion, and suggesting that they might make the experiment of occupying, for a time at least, separate bedrooms. To this he consented, and got a room prepared for himself against his wife's return. She returned on

the 18th December, but in spite of this resolution intercourse took place that night. This, however, was the only time on which this happened after her return. In the early morning of the 19th she became unwell, and had a perfectly natural period, lasting for the usual time and of normal amount. Accordingly, though she had been at a loss to account for the stoppage of her periods, she could not believe that she was pregnant, more especially as her thirteen years of sterility had put all such ideas out of her head. There was no doubt, however, of her condition, for I attended her on the 16th September, and delivered her of a healthy fœtus weighing 8 lbs.

Of course, the interest and value of such a case depends primarily on the absolute accuracy of the facts, and this again hangs on the veracity of the patient. Of this last element I have no fraction of doubt, and there was obviously no reason for any concealment or prevarication. Moreover, I took an early opportunity of questioning her husband regarding the circumstances of his wife's return, and he confirmed her statement in every particular.

Assuming the facts, then, to be as I have stated them, the case is one which presents some points of scientific and clinical interest.

The first matter of note is the interval between the date of coitus, 18th December 1890, and that of labour, 16th September 1891, which is exactly 272 days. Now, it is a remarkable fact that this number corresponds almost exactly with the average duration of a large number of cases collected by Loewenhardt, Leuchardt, and Hasler.

Loewenhardt[1] collected 518 cases in which the woman could state exactly the date of coitus, and he found that the average duration was 272·2 days. Leuchardt[2] collected 67 cases from the marriage and birth register of a church, and found that the average duration of pregnancy in cases in which the child was born within ten months of marriage was 272·5 days. Hasler[3] compared a large number of cases in which the date of coitus could be determined, and found the mean duration of pregnancy was 272·24 days from the coitus.

Other cases have been collected by Ahlfeldt,[4] who found an average of 271 days in 425 cases; by Hecker,[5] who from 108 cases found an average of 273·52 days. Duncan[6] collected 46 cases, and found an average of 275 days; while Veit collected 43, and found an average of 276·42 days.

[1] *Archiv für Gynæk.*, B. iii., 1872, p. 457.
[2] *American Syst. Obstetrics*, vol. i. p. 95.
[3] *Ueber die Dauer der Schwangerschaft*, Zurich, 1876.
[4] *Monatsch. für Geburts.*, xxxiv., 1869, p. 180.
[5] *Ibid.*
[6] *Fecundity, Fertility, and Sterility*, second edition, p. 435.

These last two sets, while giving a larger period, are less reliable than those previously quoted, since they are based on a much smaller number of cases; and it is interesting to note that the case now recorded agrees wonderfully with the mean of the largest number of collected cases.

It is further to be noted that the calculation of the onset of labour from the last menstruation would have been in this case a fallacious reckoning. Taking the ordinary method given in the periodoscopes, and allowing 280 days from the last day of the last menstruation, we should have come to the 27th September instead of the 16th; and while, for want of a better opinion, I mentioned this day to my patient, I warned her to be prepared a week or ten days beforehand.

This case is also of interest in indicating that the process of menstruation does not apparently interfere with the passage of the spermatozoa along the uterine cavity. Unless we claim a rate of travel for the spermatozoa much greater than is ordinarily admitted, they must have been caught in the menstrual discharge which began to flow within an hour or two after they were thrown into the vagina. In spite of this, however, they must have made their way against the downward current of the menstrual blood, and have reached the Fallopian tube in good time to fertilize the ovum discharged. This fact seems to tell somewhat against the view held by Tait,[1] that fertilization normally takes place in the uterus, and that the cilia of the tube are there as a safeguard to prevent the spermatozoa entering the tube. According to his view, it is only in diseased tubes, where the cilia are absent or ineffective, that the spermatozoa enter the tube, the current set up by healthy cilia being in all cases sufficient to prevent their ingress. It seems to me, however, that if spermatozoa can make their way against a free menstrual discharge, the ciliary current of the Fallopian tube need give them little trouble.

In connexion with this matter, Duncan points out that where a fertilizing insemination takes place just before the period is due the latter frequently "does not take place at all, or only very scantily; the uterine system, as it were, anticipating the conception and preventing the failure which might result from a free discharge of blood." It is evident that such cases occurring in married women would be very liable to be considered "cases of gestation protracted a month."[2]

In this respect my case differs from these referred to here, for the patient assures me that the period was a perfectly natural one, in no respect differing from any of those which had immediately preceded it.

In discussing the mechanical influences of the menstrual flow on spermatozoa lying in the lower part of the genital tract, Duncan

[1] *Lectures on Ectopic Pregnancy*, p. 4.
[2] *Fecundity, Fertility, and Sterility*, p. 431.

gives it as his opinion that they would be washed away by the discharge. At the same time he cites a case, recorded by Mauriceau, in which a woman was impregnated during the flow of the menses.

Lastly, one may inquire, Why should this single coitus after thirteen years of married life be followed by conception? The only explanation I can offer is, that the woman had been longer absent from her husband than on any previous occasion. She was in perfect health, generally and locally. She returned to her husband at the very time when conception is most likely to occur—namely, about the menstrual period—and any tendency to abortion which she may have had was not in this case excited by subsequent acts of intercourse. I am persuaded that the prolonged absence from home and the caution against too free indulgence in intercourse have in many cases as much to do with the cure of cases of old-standing sterility, of which we hear and read, as the so-called treatment by the world-renowned specialists, who, however, claim all the credit.

Dr Haultain thanked Dr Murray for bringing before the Society the account of such an interesting and instructive case. It certainly showed, as near as it possibly could be shown, the probable period of human gestation to be 272 days, because it must be accepted that the ovum which was impregnated was that which was shed at or about the menstrual period following the connexion. Further, it was an illustration strongly favouring the seat of impregnation being outside the cavity of the uterus, probably in the tube, as it is almost inconceivable for the spermatozoa to battle with the menstrual flow for four days waiting for the ovum to turn up to become impregnated. In support of the theory that the tube is the probable seat of impregnation, two cases of unruptured tubal gestation which he (Dr Haultain) had examined, showed the proximal end of the tube to be lined with normal ciliated epithelium, a condition which, according to Lawson Tait, would be an effectual barrier to the passage of the spermatozoa. Thirdly, assuming the ovum to have been impregnated in the tube, and probably at its outer third (the usually accepted situation), the case certainly showed that the passage of spermatozoa through the female genital tract was very rapid—an interval of but two hours having allowed the sperms to travel a distance of 3 inches. Henle's assertion, therefore, that they travel at the rate of an inch in 7½ minutes could not be very far wide of the mark. From these considerations and others, the case was one of much scientific interest, and he must say that he was sure the thanks of the Society would be accorded to Dr Murray for bringing it before them.

VI. REPORT OF THE ROYAL MATERNITY AND SIMPSON MEMORIAL HOSPITAL, FOR THE QUARTER ENDING 31ST JULY 1891.

By HAMILTON G. LANGWILL, M.B., C.M., Resident Physician.

INTERN CASES.

DURING the quarter 75 women were treated in the Hospital. Of these 40 were i.-paræ, 20 were ii.-paræ, 5 were iii.-paræ, 4 were iv.-paræ, 3 were v.-paræ, 1 was a vi.-para, 1 a vii.-para, and 1 a xii.-para.

Age.—(*a.*) Primiparæ: average age, 21 years 4½ months; youngest, 17 years; oldest, 29 years. (*b.*) Multiparæ: average age, 28 years 2½ months; youngest, 20 years; oldest, 39.

Duration of Labour.—(*a.*) Primiparæ: average duration of first stage, 20 hours 18 minutes. Longest, 96 hours. [*N.B.*—This was a case of induced labour for contracted pelvis. Owing to the inclusion of this case, the averages in the class of primiparæ are unusually high.] Shortest, 2 hours. Average duration of second stage 2 hours 18 minutes. Longest, 8 hours; shortest, 10 minutes. Average duration of third stage, 11 minutes. Longest, 30 minutes; shortest, 5 minutes. [*Noté.*—In 9 cases the relative duration of first and second stages could not be got, and in 3 others the whole labour was over before the patients were admitted into Hospital.] Average duration of whole labour, 20 hours; longest, 100 hours 15 minutes; shortest, 4 hours. (*b.*) Multiparæ: average duration of first stage, 7 hours 42 minutes. Longest, 24 hours; shortest, 2½ hours. Average duration of second stage, 49 minutes. Longest, 2 hours 40 minutes; shortest, 10 minutes. Average duration of third stage, 11 minutes. Longest, 30 minutes; shortest, 5 minutes. Average duration of whole labour, 8 hours 37 minutes. Longest, 25 hours 25 minutes; shortest, 1 hour. [*Note.*—In 3 cases the relative duration of first and second stages could not be determined.

Presentations.—Primiparæ: vertex, 36; brow, 1; pelvic, 1 (footling); delivered outside and then admitted, 3; total, 41. Multiparæ: vertex, 34; pelvic, 2 (1 footling); total, 36.

Sex and Weight of Children.—(*a.*) Primiparæ gave birth to 28 males and 13 females. The average weight of the males was 7 lbs. 7 oz.; heaviest, 10 lbs. Average weight of females, 7 lbs. 4 oz.; heaviest, 9 lbs. (*b.*) Multiparæ gave birth to 12 males and 24 females. Average weight of males, 8 lbs.; heaviest, 9 lbs. 6 oz. Average weight of females, 7 lbs. 2 oz.; heaviest, 8 lbs. 14 oz.

Length of Children.—The average male measured 19½ in.; longest, 22 in. Average female measured 18¾ in.; longest, 21 in.

Placentæ.—Average weight of male placenta, 1 lb. 4¾ oz.; heaviest, 2 lbs. 4 oz. Average weight of female placenta, 1 lb. 10½ oz.; heaviest, 2 lbs. 4 oz.

Cord.—Average length of male cord, 23 in.; longest, 33 in. Average length of female cord, 21¾ in.; longest, 31 in. The insertion of the cord was marginal in 4 cases. In 10 cases the cord was *once* round the child's neck; in 1 case it was *twice* round. In 2 cases it was once round the arm.

Peculiarities of Children.—One child had slight hypospadiæ. One had a rudimentary digit on the ulnar side of the little finger of the left hand—the middle and ring fingers of the same hand being completely webbed.

Classification of Labours.—Natural, 39; laborious, 26 (lingering 9, instrumental 19); præternatural, 3; complex, 6; abortions, 1. Natural labours: in one case the labour was precipitate, the child and placenta being dropped on the floor as the mother—a primipara—was walking to bed. One case was premature—at the eighth month.

Laborious Labours.—There were 7 of these lingering and 19 instrumental. "High forceps" were used on 4 occasions for contraction of pelvis, one of the cases also being complicated by prolapsus funis. "Low forceps" were employed 15 times, 2 of the cases being persistent "face to pubes" cases.

Præternatural Labours.—Three cases occurred, all of them breech, in each case a premature putrid fœtus being born.

Complex Cases, 6.—Of these *two* cases were examples of twin pregnancy, the children in each case being of same sex,—once boys, the other girls. The second of the cases occurred in a primipara with marked albuminuria (see special report). One was a case of eclampsia in a primipara, the child being delivered by forceps. One was a case of prolapsed cord in a ii.-para, who had a contracted pelvis, forceps being applied with satisfactory result to mother and child. The fifth was a case of placenta prævia with albuminuria, and the last a case of accidental hæmorrhage (*vide* special report).

Abortions.—One case occurred in a i.-para, who had been delivered outside of a five months' putrid abortion.

Post-Partum Hæmorrhage occurred only once, and that not to a severe extent, being checked by the ordinary means.

Perineal Tears occurred 10 times, 4 of these being in forceps delivery cases. The tears were stitched at once, and all of them did well except in one case, where complete union did not occur.

Ophthalmia Neonatorum occurred only once, and that in a very mild degree. A few drops of solution of nitrate of silver (gr. iv. to ℥j.) were instilled into the eyes of each child immediately after birth.

Puerperium.—There were no cases of phlebitis or phlegmasia. For the first month of the quarter, while occupying the upper flat of the Hospital, there was constant trouble from rises of temperature in the majority of the cases. In most of the cases the rise of temperature was only slight, but in several it rose to 102°–104°; and

in several cases intra-uterine douches had to be employed, owing to lochial fœtor. All these cases subsequently did well before leaving the Hospital. In the middle of the term the patients were transferred to the lower wards, and from that date normal temperatures were present in nearly every case. One of the cases of pyrexia presented specially interesting symptoms (see special report).

Mortality:—(1.) *Maternal* deaths, 0.

(2.) *Fœtal*, 12. Of these 6 were putrid premature children. One was an abortion (putrid), 2 cases of high forceps delivery for contracted pelvis, 1 in a case of placenta prævia, 1 in a case of accidental hæmorrhage, and 1 in a difficult forceps delivery for large size of the head.

(3.) *Infantile*, 4. One twin died on sixth day from debility. Another child, prematurely delivered, died on the sixth day. One case of tedious forceps delivery died a few hours after birth. One (case of brow presentation converted into "face" and delivered by forceps) died on second day.

The following cases deserve special notice:—

1. *Accidental Hæmorrhage: Version.*

A. S., æt. 22, ii.-para; admitted at 10 A.M. June 8. Patient on admission looked extremely pale and exhausted, as though suffering from severe shock or hæmorrhage, but no such history could be elicited. All the information that could be got from her was that she was last "unwell" in January. Three weeks ago she had a bad fall on a stair. She was in almost continual pain, and lay groaning. Pulse very feeble. The uterus extended to 3 inches above the umbilicus, and was continuously hard and contracted. No fœtal movements or fœtal heart sounds discoverable. The os was closed and cervix rigid. Head presenting. Opiates were administered with slight relief to the pain, but at 12.30 P.M. profuse hæmorrhage set in, being preceded by pain over the left lower part of the uterus. The os was found now to admit one finger, but the cervix was extremely rigid. Plugging was thus resorted to. On Dr Milne Murray's arrival, at 3.45, the plugs were removed and Barnes' bags were employed, the os at this time only admitting two fingers with difficulty. When further dilatation had occurred the membranes were ruptured and a leg brought down, the cord and one arm prolapsing at the same time, but the latter was replaced. The os dilated very slowly, and in two hours the head was delivered, and with it the placenta, which was lying loose. From the time of the rupture of the membranes there was no further hæmorrhage until delivery was complete, when the bleeding was rather severe, but was checked by ordinary measures. The fœtus was quite dead (no movements had been felt for several days, as was afterwards found out). Patient made a good recovery,

though intra-uterine douches required to be employed once or twice owing to lochial fœtor.

2. *Puerperal Peritonitis: Influenza (?).*

The following case was of somewhat obscure nature, presenting many of the features of the then prevalent influenza:—

J. B., 18, i.-para. Patient, who had had a normal labour save for a perineal tear, was quite well on the morning of the 8th day when the stitches were removed, the wound being practically healed. Lochia, etc., normal. At the evening visit, June 9th, she was complaining of intense pain over the lower part of the abdomen, which was much aggravated by attempting to extend the lower limbs, which she refused to do. Nurse stated that the lochia, which had ceased in the forenoon, had recurred again, being, however, bright red. The abdomen, which was much distended, was extremely tender, palpation being impossible. Patient had also severe frontal headache. She says she had a shivering about 1 P.M., but told no one, and the pains in the abdomen (which she attributed to Henry's solution administered in the morning) had increased all afternoon. Temperature, 102°·5; pulse, 130, small. Morphia and turpentine with laudanum stupes were ordered. Before the former began to take effect she was writhing in bed with the pain and screaming loudly. Two hours later she was much easier, but presented new symptoms, as of coryza, her eyes being very red and watering profusely, her nose, as she said, "stuffed," while she spoke like a patient with a "cold in the head." The "headache" was still severe, but was now chiefly felt "in the back of the eyes." She had also severe pains in all the bones, making any movement painful. No articular symptoms or rash present. Her sleep during the night was very broken owing to "startings," which were, however, unaccompanied by pain. She was also delirious. An intra-uterine douche was given at midnight as the lochia were very slimy and red. During the next day patient's temperature rose to 105°, but fell after a uterine douche. She was kept under the influence of morphia, and antipyrin was administered for the headache with temporary success. Two days later, *i.e.*, June 11th, all abdominal pain and tenderness was gone, and thorough palpation revealed nothing abnormal. Headache and backache the only complaints now. Antifebrin gr. viii., repeated twice, brought the temperature down to 99°·4 and gave great relief to the patient.

June 13th.—Headache now gone. Patient complains of pain in the region of the perineum while being douched. Dr Underhill found at left side of cervix, and partly fixed to the uterus, a hard swelling which is tender on pressure; temperature (104°·2) reduced by antifebrin.

June 15th.—Temperature coming down slowly. Lochia now

practically normal. Bowels moved naturally. All tenderness in region of left fornix now gone.

June 22nd.—Patient returned home to-day feeling perfectly well.

3. *General Œdema: Post-Partum Polyuria.*

B. S., 18, i.-para. Patient, who is almost at full time, sought admission on account of swelling of her lower limbs, which had begun a fortnight before admission. She was of very stout build, flabby muscularly, and of pale, unhealthy complexion. There was marked œdema of the whole body, the breasts and abdominal walls "pitting" markedly, while the lower limbs were very swollen. The pigment in the skin of the abdomen was very marked and extensive. Systolic murmurs are audible over the apex and in the aortic area, while the second sound is reduplicated in the pulmonary area. Amount of urine per diem previous to her confinement, 12–16 oz. No albumen. Her labour was an instrumental one, the child measuring 22 in. and weighing 8¾ lbs. The amount of urine subsequently passed was as follows:—(Day of puerperium) 1st, 78 oz., 2nd, 86 oz., 3rd, 48, and 4th, 64 oz. The œdema was now gone. Cardiac murmurs as before.

4. *Placenta Prævia: Albuminuria.*

Mrs W., 30, ii.-para, recommended for admission owing to severe bleeding. Previous labour normal. No miscarriages. During present pregnancy, which is of 8 months' duration, patient has had constant headaches, vomiting, etc., with frequency of micturition latterly. No accidents. Three nights before admission she was attacked by severe bleeding,—cause unknown. For this she received treatment at home, but on the morning of admission she again had severe hæmorrhage. No fœtal movements have been felt since the first bleeding. Patient, who is very fat, is markedly œdematous; urine shows about ⅛ albumen. Hæmorrhage set in shortly after admission, and Dr Underhill, finding it a case of central placenta prævia, performed bipolar version, plugging the cervix with one foot and leg. Pains now set in, and in 50 minutes the child was delivered. The placenta and membranes came away naturally in a few minutes, and very little blood was lost. Patient progressed well despite a rise of temperature on the 6th day to 104°·6. Her urine became much increased in amount, 70–80 oz. being passed for diem. She left on the 17th day practically well.

5. *Eclampsia: 2 Cases.*

1. T. M., 19, i.-para. Patient (who had previously been admitted with false pains) was re-admitted to hospital on May 13th, being now in labour, with fairly strong pains, but marked rigidity of the cervix, for which chloral was administered. The first stage thus occupied about 20 hours. While walking to the delivery

room from the ward she fell down in an eclamptic seizure, which rapidly passed off. Her urine, which was then drawn off, showed a mere cloud with nitric acid. No appearance of œdema anywhere. She was treated with bromide and chloral, the labour now proceeding fairly well. Towards the close of the second stage, however, she had another convulsion, for which chloroform was given. The child was born an hour subsequently, forceps being employed. The head was in the R.O.P. position, and underwent the "long rotation." Patient made an excellent recovery, and left on the 12th day; urine normal. (The child died a week later of convulsions.)

Puerperal Eclampsia: Twins.

2. M. B., 25, i.-para. Admitted at 1 A.M., pains having begun at midnight. Patient was extremely œdematous, face very puffy. Sample of urine drawn off showed about ½ albumen. Purgatives and diuretics administered, with mustard over the loins. At 8.30 A.M. the first child was born, and in twenty minutes the second followed, whole labour lasting 10½ hours. At 3 P.M. of same day the house-surgeon was called to find her in the clonic stage of an eclamptic seizure, for which chloroform was given, followed by croton oil, and pilocarpin, pot. bromid., and chlor. hydr. also administered. She had no further seizures, her puerperium being chiefly noticeable for the amount of urine passed; on four consecutive days the quantity being 130 oz., 114 oz., 104 oz., 82 oz. The dropsy had entirely gone when she left the hospital, and merely a trace of albumen remained.

In addition to the last 3 cases, in all of whom albuminuria was present, the following are brief notes of 3 additional cases in which this symptom occurred, but with no untoward result.

(*a.*) E. C., 21, i.-para. Lower limbs and abdominal wall distinctly œdematous. Marked quantity of albumen present. Labour was normal. Patient presented no signs of renal mischief. Œdema entirely, and albuminuria almost gone by the 10th day.

(*b.*) Mrs M'P., 33, vi.-para. Pale, anæmic woman, with very marked œdema of abdominal wall, which presented a thick fold in the hypogastrium. Lower limbs also very swollen. There was a very large amount of liq. amnii, and there was slight hæmorrhage between the 2nd and 3rd stages. Her urine was found to be distinctly albuminous, with casts; and she had suffered during her pregnancy from vomiting, headache, frequent micturition, etc. Her urine was normal by the 8th day.

(*c.*) L. B., 20, i.-para. Patient is only in the 8th month of her pregnancy. Marked "pitting" of abdominal wall and lower limbs; urine albuminous. Her labour was chiefly characterized by the very slight amount of pain which she experienced. The œdema and albuminuria soon passed away, as in the other cases.

Extern Cases.

During the quarter 104 cases were delivered. Of these, 16 were primiparæ.

Classification of Labours.—Natural, 87; laborious, 6 (lingering 2, instrumental 4). Præternatural, 3; complex, 5; abortions, 3.

Presentations.—Cephalic, 103; pelvic, 4. Total, 107.

Details: Natural Labours.—One case was precipitate, the child falling on the floor with rupture of the cord—uninjured, however. 4 cases were premature, one at the seventh month being in a markedly syphilitic patient, who had smart post-partum hæmorrhage.

Instrumental Labours.—Forceps were used four times, once for persistent R. O. P. position, in the second of twins, once for impacted anterior lip of cervix in a xiii.-para, who had severe post-partum hæmorrhage from the relaxed lower uterine segment. The other 2 cases were for inertia uteri (one being a case of putrid fœtus).

Præternatural.—3 cases, all breech, one being stillborn.

Complex.—5 cases; 3 of these were cases of twins. In one case (a vi.-para) the first twin was born easily in L.S.A. position. Owing to inertia the house-surgeon was sent for, who delivered the second twin in the persistent R.O.P. position by forceps. Both children did well. In the second case both presented by the head; the first was alive, the second one dead (putrid) with the cord tightly twisted round the neck. In the third case the first presented by the head, the second by the breech. There was one case of accidental hæmorrhage complicated with mitral stenosis. One was a case of prolapsus funis replaced by the student.

Abortions, 3. Two of these about the third month. One about the fifth month, in which the whole ovum was born entire, fœtal movements being distinctly visible after birth. Delay in the third stage occurred in 7 cases. In 2 of these the placenta had to be stripped from the uterine wall, and in 1 case the secundines.

Perineal Tears occurred in 5 labours, all of them natural.

Post-Partum Hæmorrhage occurred twice, once in a xiii.-para with impacted anterior lip (forceps delivery); the other was a case of premature labour in which the student was not sent for until severe hæmorrhage had occurred.

Sex.—Males, 52; females, 52.

Mortality.—(1.) Maternal, 0.

(2.) *Fœtal,* 10, of which 3 were abortions, 5 were putrid, 1 a breech case, and 1 a case of accidental hæmorrhage.

(3.) *Infantile,* 2. One a 6½ months' child. One child died on third day from suppression of urine.

The following case deserves special notice:—

Mitral Stenosis: Accidental Hæmorrhage: Version.

Mrs M., 25, iv.-para. Patient, who is only in seventh month of

her pregnancy, had a sudden discharge of liq. amnii on June 19th, 1891. The house-surgeon was called next morning, and found the os patulous, with head presenting and fœtal movements easily made out. Patient (who was extremely disfigured by lupus of the face) was markedly œdematous in the feet and legs. Physical signs of mitral stenosis were easily detected. Pulse regular; urine normal. There had been no discharge of blood, but the liq. amnii was still dribbling freely. No uterine pains present. On June 23rd pains occurred, and the house-surgeon (knowing of her cardiac disease) visited the case himself, and while in the house profuse hæmorrhage suddenly occurred. There was no sign of abnormal placental implantation. Bipolar version was performed under chloroform, and a leg pulled down to plug the cervix. Dr Milne Murray (who had been sent for) now took charge of the case, but the head stuck in the undilated cervix so that the child succumbed. So rigid was the cervix that Dr Murray thought of perforating the head, but after about half an hour the head was delivered. Patient's subsequent progress was entirely satisfactory. She has never had rheumatism, but had chorea at the age of 6 years. Her three previous children are all alive.

INDEX.

Abdominal sections, a series of, 270.
Alleged growth of the placenta in extra-uterine gestation after the death of the fœtus, 79.
Anencephalus with spina bifida, 194; sectional anatomy of, 228.
Asthma gravidarum, 74.
Axis-traction forceps, on the use of, 221.

Ballantyne, Dr J. W., shows obstetrical pocket phantom, 2; on Drs Hart and Gulland's demonstrations, 16; on Dr John Thomson's paper, 49; shows vaginal dermoid tumour, 49; on the investigation of fœtal disease, 53; on Dr Felkin's paper, 74; on a series of thirteen cases of alleged maternal impression, 99; on Dr Mackness's paper, 119; on Dr John Thomson's paper, 133; on clinical notes of four cases and description of two specimens of general dropsy of the fœtus, 133; on general dropsy of fœtus, 148; on general dropsy in twin fœtus, 177; on the sectional anatomy of the anencephalic fœtus, 228; shows specimen of retarded development of embryo, 240; shows specimen of exomphalos and anencephaly, 241; shows fœtus with umbilical hernia, 241; shows case of multiple deformities in a fœtus, 242; shows a hernia of umbilical cord, 243; on a case-taking scheme for fœtal diseases and deformities, 262; on Dr Brewis's paper, 277; shows frozen sections of an exomphalic and anencephalic fœtus, 278; a knotted umbilical cord, 279; a specimen of velamentous insertion of umbilical cord, 280.
Brewis, Dr N. T., on two cases of vaginal hysterectomy for sarcoma of the uterus, 120; on Dr Ballantyne's papers, 190; on Dr Haultain's paper, 262; on a series of abdominal sections, 270.

Carcinoma cervicis, vaginal hysterectomy for, 12.
Case-taking scheme for fœtal diseases and deformities, 262.
Church, Dr, shows specimens of pulmonary thrombosis, 195; on thrombosis of the pulmonary arteries, 210; on Dr Ballantyne's paper, 239.
Clarke, Dr J. A., shows two sarcomatous uteri, 1.
Congenital obliteration of bile-ducts, 1, 17; of small intestine, 128; of gall-bladder, 191.
Croom, Dr J. Halliday, on asthma gravidarum, 74; on Dr Hart's paper, 91; on cases illustrative of operative interference with fibroid tumours during pregnancy, labour, and puerperium, 92.
Cullen, Dr, shows specimen of anencephalus, 194; on Dr Church's paper, 220; on Dr Ballantyne's paper, 239; on Dr Ballantyne's case-taking scheme, 270.

Dermoid tumour, vaginal, 49.
Development of female genital organs, 16.
Dewar, Dr Michael, on the use of the axis-traction forceps, 221.
Dropsy, general, of fœtus, 133, 148; of twin fœtus, 177.

Embryo, retarded development of, 240.
Exomphalos and anencephaly, specimens of, 241, 243, 278.
Extra-uterine gestation, alleged growth of placenta in, 79.

Fallopian tube, developmental anomalies of, 194.
Felkin, Dr, on Dr Ballantyne's paper, 66; on the influence of influenza on women, 68.
Female pelvis at beginning of fifth month of pregnancy, 244.
Fibroid tumours during pregnancy, labour, and puerperium, 92.

Fœtal disease, investigation of, 53; case-taking scheme for, 262.
Fœtus, general dropsy of, 133, 148; of twin fœtus, 177.
Fœtus, umbilical hernia of, 241.
Fœtus, multiple deformities of, 242.
Fœtus, hernia of umbilical cord in, 243; hydrocephalus of, 280.
Fœtus with numerous grave anomalies, 243.
Fœtus with groove on parietal bone, 281.

Gall-bladder, partial obliteration of, 191.
Gulland, Dr G. L., gives demonstration of development of female genital organs, 16; on the structure of the human placenta, 195; gives demonstration of sectional anatomy of pregnancy in Macacus rhesus, 281.

Hart, Dr D. Berry, gives valedictory address, 2; on vaginal hysterectomy for carcinoma cervicis in early pregnancy, 12; gives demonstrations of development of female genital organs in early fœtal life, 16; on Dr Croom's paper, 79; on the alleged growth of the placenta, 79; on Dr Croom's paper, 98; on Dr Mackness's paper, 119; on the structure of the human placenta, 195; on Dr Church's paper, 220; on Dr Dewar's paper, 226; on Dr Webster's paper, 255; gives demonstration of sectional anatomy of pregnancy in Macacus rhesus, 281.
Haultain, Dr, on Drs Hart and Gulland's demonstrations, 17; shows two specimens of developmental anomalies of the Fallopian tube, 194; shows a uterine polypus, 244; on pedunculated uterine growths, 255; shows a uterus removed by the Porro-Müller Cæsarean section, 277; on Dr Milne Murray's paper, 286.
Hernia of umbilical cord in a fœtus, 243.
Hydatid mole, 50.
Hydrocephalic fœtus, 280.

Influenza, influence on women, 68.
Intra-cranial hæmorrhage, specimen of, 1.
Investigation of fœtal disease, 53.

Knotted umbilical cord, 279.

Macacus rhesus, sectional anatomy of advanced pregnancy in, 281.
Mackness, Dr G. O. C., on a case of placenta prævia, 116.
Martin, Dr J. W., shows a hydatid mole, 50; shows a morbid placenta, 52; on Dr Ballantyne's paper, 66.
Maternal impression, thirteen cases of, 99.
Maternity quarterly reports, 108, 287.
Menstruation and impregnation, relation between, 281.
Murray, Dr Milne, shows a hydrocephalic fœtus, 280; a fœtus with groove on parietal bone, 281; on a case bearing on a relation between menstruation and impregnation, 281.

Pedunculated uterine growths, 255.
Placenta, specimen of morbid, 52.
Placenta prævia, case of, 116.
Placenta, structure of, 195.
Playfair, Dr, on Dr Felkin's paper, 73; on Dr Mackness's paper, 119; on Dr Brewis's paper, 127; on Dr Church's paper, 220; on Dr Dewar's paper, 226; on Dr Ballantyne's paper, 239.
Porro-Müller Cæsarean section, uterus removed by, 277.
Pulmonary thrombosis, 195, 210.

Rattray, Dr, on Dr Ballantyne's paper, 65; on Dr Felkin's paper, 74.
Relation between menstruation and impregnation, 281.
Retarded development of embryo, 240.
Ritchie, Dr James, on Dr Church's paper, 220.

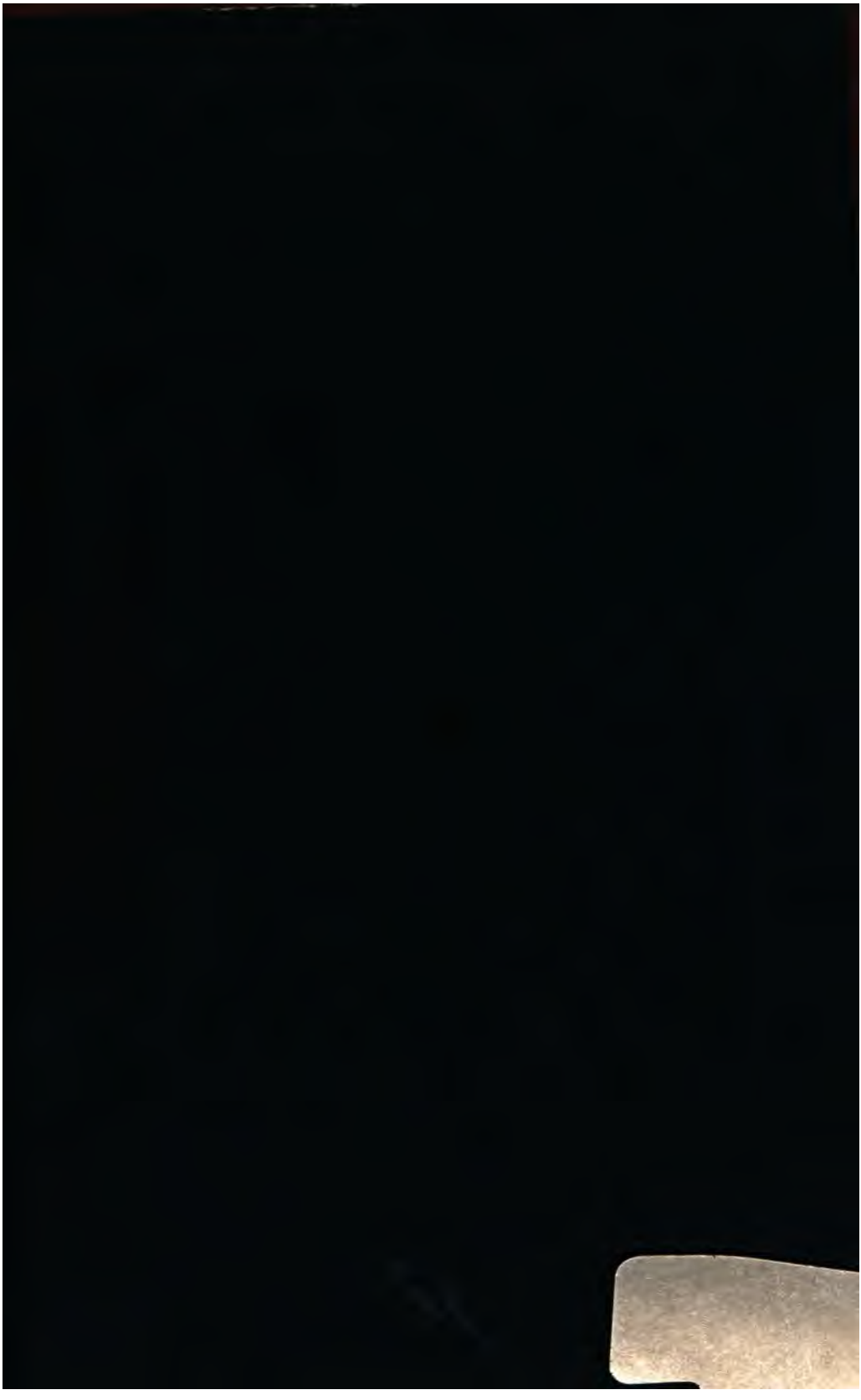
Sarcomatous uteri, 1, 120.
Sectional anatomy of advanced pregnancy in Macacus rhesus, 281.
Simpson, Prof. A. R., remarks on taking presidential chair, 12; on Drs Hart and Gulland's demonstration, 16; on Dr Ballantyne's paper, 65; on Dr Felkin's paper, 73; on Dr Croom's paper, 79; on Dr Hart's paper, 91; shows fœtus with numerous grave anomalies, 243; on Dr Webster's paper, 255; on Dr Haultain's paper, 262; on Dr Ballantyne's paper, 269.
Small intestine, congenital obliteration of, 128.
Strassman, Dr P., on Dr Brewis's paper, 127; on Dr Ballantyne's papers, 190.
Studies in fœtal pathology and teratology, 53, 133, 148, 177, 228, 262.

Thirteen cases of alleged maternal impression, 99.
Thomson, Dr John, shows liver with congenital obliteration of bile-ducts, 1 ; on congenital obliteration of the bile-ducts, 17 ; on Dr Ballantyne's paper, 65 ; on congenital obliteration of small intestine, 128 ; on case of partial obliteration of gall-bladder, 191.
Twin fœtus, general dropsy of, 177.

Umbilical hernia in fœtus, specimen of, 241.
Umbilical cord, knot of, 279.
Umbilical cord, velamentous insertion of, 280.
Underhill, Dr, on Dr Hart's valedictory address, 11 ; shows specimen of exomphalos and anencephalus, 243 ; on Dr Haultain's paper, 261 ; on Dr Ballantyne's paper, 269.
Uterine polypus, 244.

Vaginal dermoid tumour, 49.
Vaginal hysterectomy for carcinoma cervicis, 12 ; for sarcoma of the uterus, 120.
Valedictory address. 2.
Velamentous insertion of umbilical cord, 280.

Webster, Dr J. C., shows specimen of intra-cranial hæmorrhage, 1 ; on Dr Dewar's paper. 226 ; shows mounted section of female pelvis at beginning of first stage, 244 ; on the female pelvis at the beginning of the fifth month of pregnancy, 244.

PRINTED BY OLIVER AND BOYD, EDINBURGH.

1 gal
342